The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. X. No. 250 MARCH 29, 1924 Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.5.0.

Contents

	PAGE
EDITORIAL NOTES.—Markets for British Chemicals: Developments in Sulphuric Acid Plant: On Keeping Up to Date: The Chemist's Debt to Physics	309
British Empire Exhibition at Wembley	312
Sulphuric Acid Plants, Old and New. By P. Parrish	316
Markets for British Chemicals Overseas	319
British Chemical Industry To-day. By W. J. U. Woolcock	322
British Goods Abroad. The British Industries Fair, 1924	323
Reviews	324
Oil and Colour Chemists' Association	325
United Alkali Co.	326
Theobromine in Cacao Fermentation. Jubilee of the Physical Society	327
Referee's Decision on "Rongalite"	328
Chemical Matters in Parliament	329
From Week to Week	330
References to Current Literature	331
Patent Literature	332
Market Reports and Current Prices	335
New Chemical Trade Marks. Company News	340
Commercial Intelligence. New Companies Registered	342

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices—8, *Bouverie St., London, E.C.4.*

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines)

Markets for British Chemicals

THE present year should provide the greatest advertisement of British products ever organised. Presently London will be flooded with business men from all parts of the world—not only from our own colonies, but from the United States, the great states of Latin-America, the Far East, and the leading European countries. At the British Empire Exhibition and at the British Industries Fair they will see a picture of the resources of the Empire which cannot fail to impress them. The collective effect in favour of British trade should be deep and wide-spread, and under cover of that collective effect the various industries will have an unprecedented opportunity for an offensive on the overseas markets of the world.

It is now recognised that it would have been a great mistake if, among the industries represented, the British chemical industry had had no place. Thanks to the efforts of the Association of British Chemical Manufacturers, the activities of British chemical manufacturers promise to be among the most interesting features of the exhibition. Visitors will see for themselves that the advances they have heard so much about of recent years are real advances, and that the growing reputation of Great Britain as a chemical manufacturing nation is well founded. Not only may some reasonable pride be taken in the high standard of quality for which British chemicals are now known, but the range of production has been enormously extended. Whatever may be said by critical people in this country, inquiries of which we hear from time to time from German quarters indicate that in Germany the advance of chemical production in this country is treated very seriously. Up to the moment, perhaps, the firms who have laid out the plant for these extensions have not had a very rich return for their expenditure and enterprise. But sound and public-spirited work of this sort rarely fails of its reward in the long run, and if for the next few years the industry in all its parts is favoured with unity and co-operation the members of it will begin to find the results more and more encouraging. In any case, the methods now being adopted are the only methods by which success can be secured.

Not only will the chemical exhibition now rapidly nearing completion reflect the enormous advances which have been made on the productive side of this very wide industry; there will also be convincing evidence of the vitality of British chemical science without which, of course, production could not for long maintain its place. In the science section there will be a whole series of sectional exhibits so arranged as to present a simple view of the stages of scientific progress. One might suppose that something in the way of talks or lectures might be necessary to convey this information. The answer is that for a constantly moving audience lectures at fixed times would not be effectual, and some confidence is felt in the ability of the exhibits, as they are to be arranged, to tell their own story. There will, however, be a record which serious students of chemical science may carry away in the shape of a volume which is being written by a group of experts with a view to showing in a conveniently compressed form the state of scientific knowledge to-day. And for the more casually interested visitor there will be a series of popular pamphlets for which Dr. Stephen Miall will be mainly responsible.

As a demonstration, therefore, of the productive and scientific sides of chemical industry Wembley should be convincing. But the aim of the exhibition does not stop there. It is satisfactory to find the prominent place which is to be given to the science of selling and advertising, on which the success of any business so much depends. During the exhibition the Associated Advertising Clubs of the World will meet in convention at Wembley, and we understand that the problem of export trade and its promotion by publicity methods will for the first time be exhaustively discussed. In this issue appears an important mani-

festo, signed by prominent commercial and other authorities, in which it is suggested that a Royal Commission on Selling and Advertising in Foreign Markets might with advantage be appointed. Mr. Woolcock, in his review of "British Chemical Industry To-day," points out how in the past British chemical products, with numbers of other manufactures, have been handicapped by "prejudice unconsciously exhibited for foreign products," and it is encouraging to hear that "constant demonstration of the excellence of the British article is wearing down the parrot-like repetition of a creed which has outlived its use." This prejudice, however unconscious on the part of the consumer, has been very consciously and deliberately aimed at by German method. We have heard research chemists confess that their preference for German products, apart from the question of quality, was largely influenced by the attractive way in which they were marketed. All those little things which the British manufacturer has been apt to treat too lightly have their place in determining the course of trade, and it is satisfactory to know that these matters are now receiving the attention they deserve.

In an issue largely concerned, as this is, with the development of overseas trade, attention may again be drawn to that invaluable series of volumes under the title of *The Resources of the Empire*, which Ernest Benn, Ltd., are publishing. Volume VII., which deals with "Chemicals," is being prepared by Messrs. A. W. Ashe and H. G. T. Boorman, with the advice and assistance of the general manager of the A.B.C.M., and will contain an introduction by Sir Max Muspratt. It will bring together in a compendious and practical form the fullest available statistical information regarding the chemical manufactures of Great Britain and the Dominions overseas, and its value to manufacturers and merchants will be obvious.

Developments in Sulphuric Acid Plants

MANY modifications have been made in plant for the manufacture of sulphuric acid during the last two decades, not only in the form which the leaden chambers take and the method by which the chemical sheet lead is supported, but in the matter of dimensions. In general, the tendency has been to increase the height of the chambers, so as to augment the surface area available for the dispersion of heat, and to adopt water sprays in lieu of steam. These modifications have undoubtedly contributed to increased production and to a reduced time factor.

An account of an interesting lecture by Mr. P. Parrish appears in another column, in which, *inter alia*, attention is directed to the time factor in sulphuric acid production. Figures ranging from 144 minutes in the old system to 24 minutes in the OPL system are furnished, but, as Mr. Parrish points out, finality in the speed of reaction has not been reached. Two new systems are cited—the Metro bubbler tank and the Schmiedel roller box—each possessing many features in common, and involving the phenomenally low time contact of approximately 2 minutes. This rapidity of reaction is attained by intimate and positive contact of the burner gases with nitrous vitriol. In the OPL system the contact between the two media is merely of a surface character. In the two novel systems named contact is made positive—in the one case by ensuring definite bubbling of the gases through a light seal of nitrous acid, with stirring in addition; in the other by the creation of a mist of nitrous vitriol by the operation of undulated rollers run at a high peripheral speed.

Some interesting power problems are involved, but, from reports which reach us, it would appear that the merits of these new developments are very large. Hot or cold gases can apparently be dealt with with impunity, and there is reason to believe that the elasticity and reliability of the two systems constitute a very hopeful feature. It is not inconceivable that either of these new systems may be capable of successful and economical application to works which hitherto could not contemplate the installation of a standard economic sulphuric acid unit. Certainly, the potentialities of the new processes appear large, and it cannot be doubted that the results of their operation will be followed with very keen interest.

On Keeping Up-to-date

THE most significant statement in one way made at the annual meeting of the United Alkali Co., Ltd., was one by Dr. Clayton, M.P., to the effect that during the last ten years practically every process employed had been modernised and modified, all the changes resulting in improved costs of production and improved conditions of working for the employees. As with species, so with businesses—the survivors are those with power to adapt themselves to changes of environment. It was this adaptability which saved the company at an early stage of its career from falling behind in the face of the competition of new processes, and it is the same quality which in these strenuous days enables it to retain its place and constantly to extend its great organisation. An example of this sort makes an excellent study for the heads of every industrial concern, especially those in which applied science plays a vital part. For not only is any industrial enterprise doomed which lags behind its competitors in plant, process, and general organisation, but it is the most efficiently managed businesses in which labour troubles most rarely arise. It is not, perhaps, fully realised that workmen are most contented when the conditions in which they work are good and when they feel that the management is efficient, appreciative of good work and progressive. Out-of-date or ill-kept plant, slack organisation that allows things to go wrong, the feeling that everything about a works is second or third rate, the knowledge that better results could be obtained by better methods—these things have a depressing effect on the whole staff and lead often to active discontent. On the other hand, the knowledge that the management is always aiming at 100 per cent. efficiency and thoroughly knows its job infects the men with a corresponding pride in their particular work and in belonging to a successful and progressive concern. The point is particularly worth attention at a time when good relations with labour are so important to industry.

The Chairman of the Company (Sir Max Muspratt) mentioned other matters of interest. In addition to recounting the steps taken to secure the comfort and contentment of the workmen, he stated that in th-

production of organic chemicals the company had extended the range of its intermediate products, and that the research work carried on for many years was to be further extended. Watching with friendly interest but some anxiety the progress of dyestuff production, he expressed some fear that co-operation was not yet quite so complete and effective as was possible and desirable. It was a friendly and well-meant hint which will not be lost.

The Chemist's Debt to Physics

THE CELEBRATION of the jubilee of the Physical Society last week was a memorable event in more ways than one. Its foundation in 1874 coincided with a period of renaissance in physical science marked by the opening of laboratories in the universities and a recognition of physics as a subject apart from mathematics. Chemistry has often been described as a branch of physics, and this is undoubtedly true. Advances in physical theory affect chemical theory and ultimately chemical practice and industrial development. The investigations of the structure of the atom and the nature of colloids have been tackled by physicists in the first instance, and are gradually leading to remarkable developments in the chemical industry. Chemical engineering has been described as applied chemical physics, so that the indebtedness of the industry to physics is very great indeed. Again, there are numerous aids to accurate work, such as recording thermometers, pyrometers, and carbon dioxide recorders which are all physical inventions of recent years. Physics is, of course, not only the fundamental branch of experimental science, but it has made the most rapid advances in recent years. It is not only on the experimental side but in its mathematical side where new theories have been developed. The most outstanding examples are the principle of relativity, with its establishment of the fact that there can be no velocity greater than the velocity of light, and the quantum theory of energy that energy changes occur not continuously but in minute pulses or quanta. These new postulates are bound to have far-reaching effects in the future.

The jubilee celebrations of the Physical Society seem to have been conceived on a scale well in keeping with the importance of the occasion. The great experimenters of our time were all present, and either contributed papers or speeches at the banquet, and, in addition, the proceedings were graced with the presence of Royalty in the person of the Duke of York, and of the State in the presence of the Prime Minister, who, incidentally, paid a personal tribute to the inspiration physical science had been in his life.

Chemistry's G.H.Q.

THOUGH the present conditions of business are not the most favourable for raising large sums of money, it is clear that a serious effort is to be made to raise funds for the establishment of a Central Chemical Headquarters. Discussions are being arranged on the question, and in this way the pulse of the industry is to be taken and the possibilities explored. Though the result of an immediate appeal might be doubtful, the decision to undertake an educational campaign is to be commended. There must, of course, be a common sentiment in favour of collecting the various chemical interests under one roof as a first condition. That secured, the next thing is to set out one or more concrete suggestions and to discover the scheme that commands most general support and falls within practicable limits. Then the work of taking round the hat might begin in earnest.

The matter is being talked about a good deal among chemical people, and among the points on which there is a demand for information are the control of any funds collected, the basis of management, the system of electing the controlling body, and the amount of autonomy to be left to the bodies who federate together. Nobody, probably, can answer these inquiries now. The answers will have to come as the result of discussion among all the interests concerned. If one may offer a suggestion, it would be that a too eager attempt to guide opinion along pre-conceived lines might defeat its own purpose. The feeling that any scheme chosen was entirely spontaneous and unforced and simply represented the best collective judgment of all concerned would be a great point in its favour.

Points from Our News Pages

A special article is published dealing with the British Empire Exhibition and indicating the progress being made in the Chemical Section (p. 312).

A recent lecture by Mr. P. Parrish, dealing with old and new sulphuric acid plants, is reproduced, with illustrations (p. 316).

The possibilities of developing South America as an export market for British chemicals are dealt with in a specially prepared article (p. 319).

Mr. W. J. U. Woolcock, reviewing the present position of the British chemical industry, states that it is now generally conceded that the trade slump is passing (p. 322).

According to our London Market Report, trade has been moving on quiet lines during the week (p. 335).

Business in the Scottish chemical market continues very slow according to our report (p. 338).

The Calendar

Apr. 1	Hull Chemical and Engineering Society: "The Constitution of Coal." A. R. Warnes. 7.45 p.m.	Hull Photographic Society's Rooms, Grey Street, Park Street, Hull.
2	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
3	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, London.
3	Institution of Mining and Metallurgy: Annual Dinner. 7.15 p.m.	Hotel Victoria, London, W.C.
4	Chemical Engineering Group: Joint meeting with Society of Chemical Industry (Birmingham Section) "The Premier Emulsifying Mill and other Colloid Mills." Capt. F. T. China.	Birmingham.
4	West Cumberland Society of Chemists and Engineers: "Froth Flotation of Coal." Major J. G. Scoular and B. Dunglinson.	Technical College, Workington.
4	Royal Institution of Great Britain: "The Nucleus of the Atom." Sir Ernest Rutherford. 9 p.m.	21, Albemarle Street, London, W.1.
4	Society of Chemical Industry (Manchester Section): Annual General Meeting. "The Tautomerism of Amidines." Professor F. L. Pyman. 7 p.m.	The Textile Institute, St. Mary's Parsonage, Manchester.

The British Empire Exhibition at Wembley

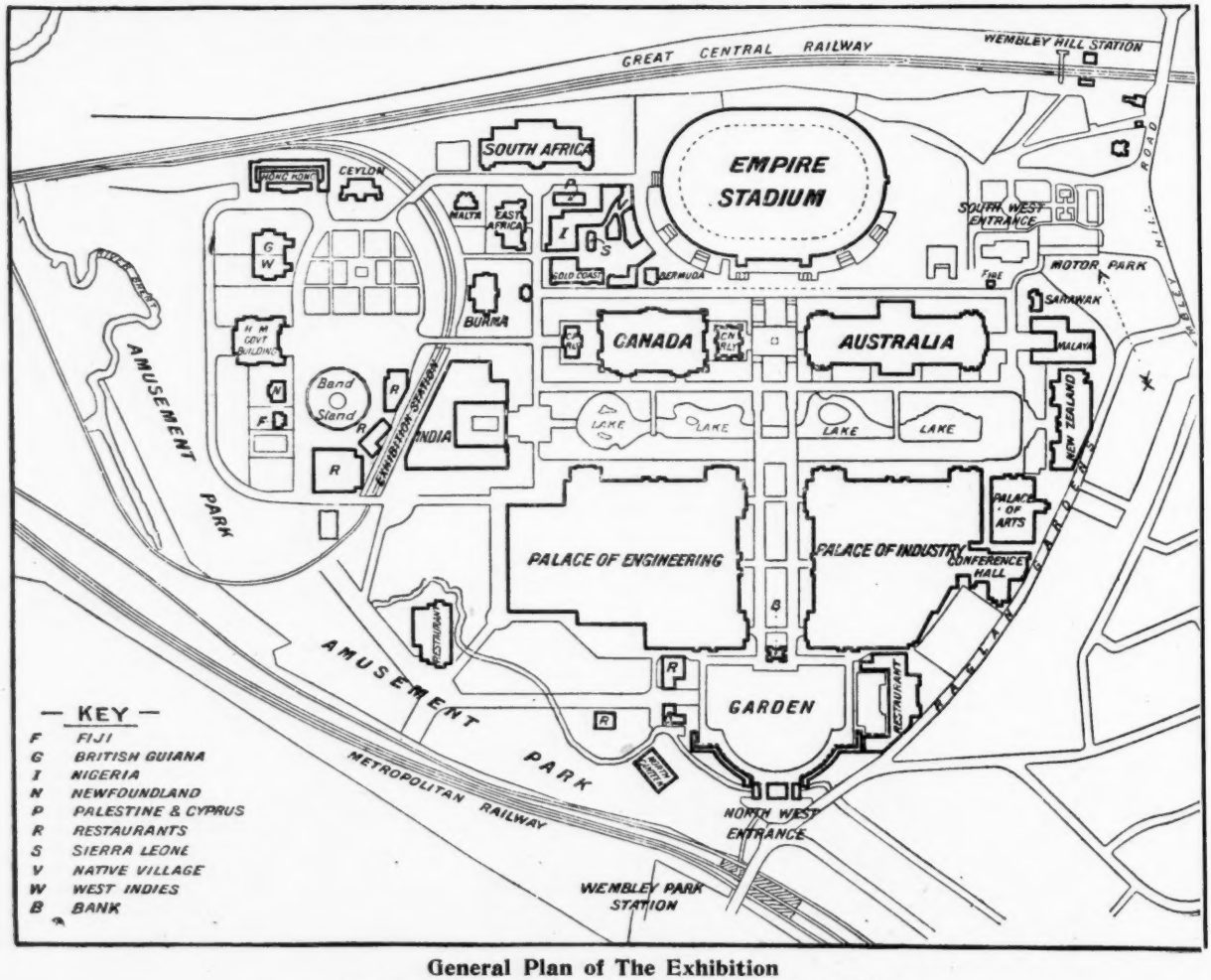
A General Review and an Outline of the Chemical Section

THE idea of the coming British Empire Exhibition, in which the Chemical Industry will be represented on an unprecedented scale, was first proposed in 1913 by the late Lord Strathcona. Soon after the war the proposal was revived by the British Empire League, and in December 1920 a special Act of Parliament was passed authorising a Government contribution to the guarantee fund, and the Dominions were officially invited to participate. The year 1924 was chosen, and it is hoped to open the exhibition on April 23, when H.M. King George will perform the ceremony.

The object of the exhibition is primarily to encourage inter-Empire trade. Secondly, the object is educational, to bring before the inhabitants of Great Britain something of the scope and resources of our Overseas Dominions. It is not a mere trade fair, but a great Imperial enterprise with the official support of the Dominion Governments, designed to serve the interests of the whole Empire by promoting mutual knowledge and by stimulating economic relations between its components. At the present time, with a prosperous America, itself looking for export markets, an unsettled Europe with a heavily impaired buying power, it is a matter of obvious business policy to study the possibilities of markets within the Empire. In most cases the British producer will find in the Dominion markets a strong preference for goods from the home country on sentimental grounds, backed up in some cases by a more practical form of preference in the form of specially favourable tariff rates. The development of the Empire's resources cannot be carried very far without markets, and this aspect is closely engaging the attention of the Overseas Dominions at the present time, and it is clear that mutual interests will be served in the Exhibition, quite apart from the development of any controversial economic schemes that have been proposed to consolidate inter-Empire Trade.

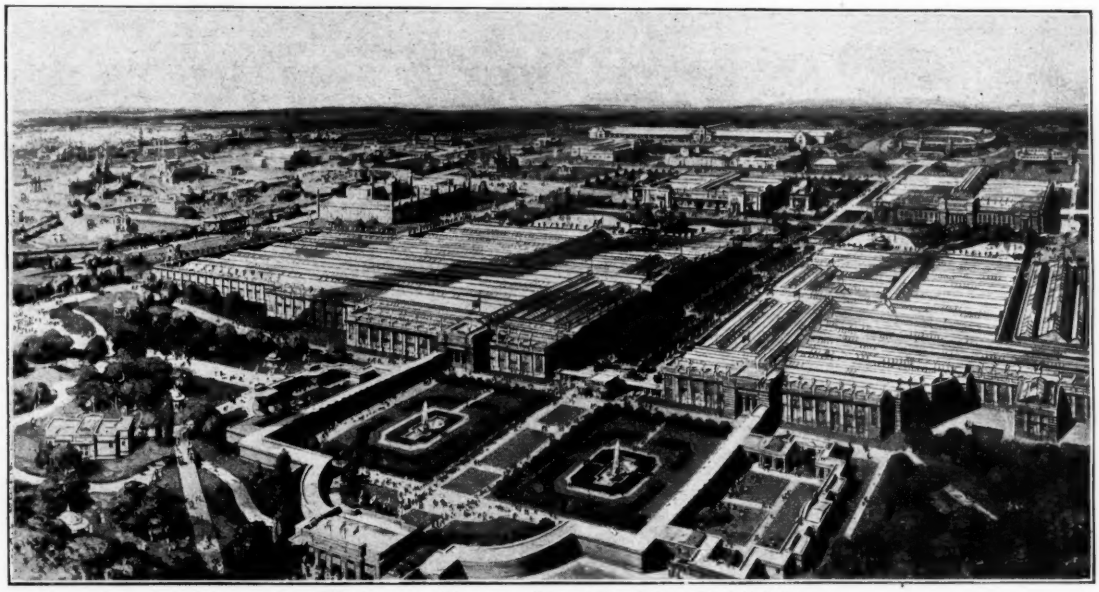
The buildings fall naturally into two classes—namely, those for home exhibits and those for overseas exhibits. The principal buildings are of a permanent nature, being constructed in ferro-concrete, so that they may be available for future exhibitions. The British industrial exhibits are to be in the two Palaces of Engineering and Industry, which together cover an area of twenty-five acres, while the first-named is the largest single building ever erected for exhibition purposes. The Dominion buildings are conceived on the same generous scale, being also of a permanent nature, while those of the various Crown Colonies are of a more temporary construction, in many cases being replicas of typical buildings in the countries concerned. The Australian Building, for example, is as large as the Olympia exhibition hall in London, and will contain a restaurant where practically the whole of the foodstuffs will be of Australian production, a sum of £250,000 having been contributed by the Australian Government to this building. The Canadian and South African buildings will be almost as large, while India is to have a similar sized structure, but carried out in the Oriental style.

The idea of making such an exhibition a centre for pleasure



General Plan of The Exhibition

(The Chemical Section is Located in the Palace of Industry)



A Bird's-eye View of The Wembley Exhibition

and amusements has been kept well in view, as may be seen from the existence of the Stadium, the lakes and gardens, and the Amusement Park.

The site in Wembley Park is six miles from the Marble Arch and of considerable natural beauty, which has been preserved as far as possible. The area is 216 acres, and some idea of the space available will be realised when it is stated that some 700,000 sq. ft. are allocated to Dominion exhibits alone, compared with 110,000 sq. ft. available at the pre-war White City exhibitions. It has been thought that Wembley is rather too far outside London for an exhibition of the kind, but at the present moment it is only half-an-hour from most parts of central London, and when the exhibition is open this time will be reduced by running of frequent special trains from Baker Street Station to Wembley Park Station and from Marylebone (L. and N.E.R.) to a new station inside the grounds, with a journey-time of ten minutes. In addition Wembley Station on the L. M. and S. Railway, is quite close, and may be reached direct from Euston or by tube from Paddington, Waterloo and other centres. A number of bus services will be put on, and all the roads leading to the exhibition have been reconstructed for the expedition of motor traffic.

The Chemistry Section

As has already been mentioned in THE CHEMICAL AGE, the Chemistry Section is situated in the Palace of Industry, with an excellent position in the north-east corner close to the north-west entrance of the exhibition and the Wembley Park Station. The area is about 37,000 sq. ft., and it is completely bounded by the outside walls and two main 75 ft. gangways, and has been constructed at a cost of some £100,000. The design of the whole section and the stands of the hundred odd exhibitors is very effective and has been carried out under the direction of a single architect—Mr. Clough Williams-Ellis. The chemical exhibits are divided roughly into four sections, heavy chemicals, dyestuffs, fine chemicals, soaps and perfumes. In addition there is to be a self-contained scientific section, where there are to be a number of exhibits illustrating the fundamental basis of the industry. The organisation of the Chemistry Section is being carried out by the Association of British Chemical Manufacturers, under the general management of Mr. W. J. U. Woolcock.

There is an Executive Sub-Committee consisting of Mr. H. Barrett, Mr. Guyton Butler, Mr. E. V. Evans, Mr. G. Gibbs, Mr. C. A. Hill, Mr. E. Linstead, Sir Max Muspratt, Bart., and General N. W. Webber, Mr. Woolcock being chairman.

The Scientific Committee responsible for the organisation of the Scientific Section consists of Dr. Herbert Levinstein (chairman) (Society of Chemical Industry), Dr. Stephen Miall (secretary) (Federal Council), Mr. J. Baker (Society of Chemical Industry), Mr. F. H. Carr (Society of Chemical Industry), Mr. E. V. Evans (Society of Chemical Industry), Dr. J. T. Hewitt (Chemical Society), Mr. J. B. Atkinson (Society of Dyers and Colourists), Mr. T. Marns (Pharmaceutical Society), Mr. E. T. Neathercoat (Pharmaceutical Society), Mr. R. B. Pilcher (Institute of Chemistry), Commander R. E. Stokes-Rees, R.N. (Institution of Petroleum Technologists), Professor J. F. Thorpe (Chemical Society), Professor J. W. Hinchley (Institution of Chemical Engineers), and Mr. W. J. U. Woolcock.

There is a Publication Committee consisting of Dr. E. F. Armstrong, F.R.S. (chairman), Mr. E. V. Evans (secretary), Professor J. W. Hinchley, Dr. H. Levinstein, Dr. Stephen Miall, Mr. R. B. Pilcher, Dr. Plimmer, Professor J. Thorpe and Mr. W. J. U. Woolcock, who are bringing out a special descriptive volume entitled *Chemistry in the XX Century*, written by a number of experts in different branches of the subjects, and also a series of popular booklets for the benefit of the man in the street.

The arrangement of exhibits in the Scientific Section has been allocated as follows :—

The Structure of the Atom, and Spectroscopy, in conjunction with the Royal Society; Crystallography, Sir Henry Miers, F.R.S.; Colloids, Professor J. W. McBain, M.A., F.R.S.; Photography, Dr. T. Slater Price, F.I.C.; General Physical and Inorganic Chemistry, Professor Donnan, F.R.S.; Alloys, in conjunction with the Royal Society; Rare Gases, Dr. M. W. Travers; Flame, Fuel and Explosion Waves, Professor A. Smithells, F.R.S.; Alkaloids, Dr. T. A. Henry and Professor F. L. Pyman, D.Sc., F.R.S.; Biochemistry, Mr. J. L. Baker, F.I.C.; Agricultural Chemistry, Sir John Russell, D.Sc., F.R.S.; Sugars, Principal J. C. Irvine, C.B.E., F.R.S.; Terpenes, Professor G. G. Henderson, F.R.S.; Colouring Matters, D. J. T. Hewitt, F.R.S., and Professor I. M. Heilbron, F.I.C.; General Organic Chemistry, Professor J. F. Thorpe, F.R.S.; Bleaching and Dyeing, The Society of Dyers and Colourists; Cellulose, Dr. C. F. Cross, F.R.S.; Explosives, Sir Robert Robertson, F.R.S.; Plastics, Dr. W. R. Ormandy, F.I.C.; Apparatus, Professor J. W. Hinchley, F.I.C.; and Historical Exhibits, Mr. R. B. Pilcher.

Some of the Chemical Exhibits

The Chemistry Section is very well advanced, as will be seen from our illustrations, which were taken in the middle of March, and it is confidently expected that it will be complete by the opening day, whatever may be the state of other exhibits. It is at present too early, however, to describe any of the chemical exhibits in detail, but the following outline of some thirty of them, mainly in the fine chemical and soap and perfumery sections, will give an idea of the whole.

AJAX ANILINE DYE MANUFACTURING CO., LTD.—Dyes and intermediates, dyed samples of various materials, including artificial silk, leather, etc. J. AND E. ATKINSON, LTD.—Perfumes, Eau de Cologne, toilet soaps and preparations of various kinds.

BOOTS PURE DRUG CO., LTD.—Fine chemicals, grouped as alkaloids, anæsthetics, antipyretics, antiseptics, glycerophosphates, hypnotics, perfume bases, research chemicals. Saccharin, stabilarsan, insulin and other special preparations. J. C. BOTTOMLEY AND EMERSON, LTD.—Samples of direct cotton, acid, chrome, union, leather, jute and other colours, and sundry chemicals. THE BRITISH DRUG HOUSES, LTD.—Medicinal and laboratory chemicals, pharmaceutical products and proprietary pharmaceutical and toilet specialities. Chemical preparations will include medicinal glucose, insulin, B.D.H. universal indicator, etc. BURGOYNE, BURBIDGES AND CO., LTD.—Medicinal and pharmaceutical chemicals. Chloral hydrate, organic acid, ketones, aldehydes, etc., of standard purity. BURT, BOULTON AND HAYWOOD, LTD.—Products from the firm's tar works, wood preservatives, colloidal sulphur. W. J. BUSH AND CO., LTD.—Perfumes and fine chemicals, particularly the products under the name of Potter and Moore, and Buisson Frères, of which they are the sole proprietors.

THE CLAYTON ANILINE CO., LTD.—A complete set of 250 colours and about 100 intermediates.

D. AND W. GIBBS, LTD.—An exhibit illustrating the manufacture of toilet soap. THE GAS LIGHT AND COKE CO.—A range of tar, ammonia and cyanogen products, beta naphthol, naphthalene, new blue shades, etc. A demonstration of the use of neutral sulphate as a fertiliser.

HICKSON AND PARTNERS, LTD.—Intermediates and dyes arranged to show the various stages in production starting from the simplest raw materials. L. B. HOLLIDAY AND CO., LTD.—A special exhibit to display the fastness of British-made dyes compared with Swiss and German products. HOPKIN AND WILLIAMS, LTD.—Chemical reagents, uranium compounds for ceramics, cerium compounds for ceramics, dyeing and tanning, thorium salts for incandescent gas mantles. HOWARDS AND SONS, LTD.—Medicinal and pharmaceutical chemicals, aspirin, etc. Synthetic solvents, such as isopropyl alcohol, cyclohexanol.

THE KALBITUM PAINT CO., LTD. Black bituminous paint for preserving iron and steel structural work. THE KEYSTONE VARNISH CO., LTD. Paints and varnishes for general and special uses, including spirit and acid proof varnishes.

B. LAPORTE LTD. Hydrogen and barium peroxide, barium salts, sodium hypochlorite, perborate, etc., laundry requisites, dry soaps, etc. LEVER BROTHERS, LTD., Soaps and soap preparations under the names "Sunlight," "Lifebuoy," "Lux," and "Vim," "Twink" dyes, etc.

The NOLABO POLISH CO., LTD.—Various labour-saving polishes for floors, metal-work, etc.

THE OFOME CO.—The Ofome cleanser, combining the uses of soft soap, household soap, cleaning powders and benzine.

J. J. RIGBY, LTD.—Soft soaps, hard soaps, for textile and household use, patent cleansers and toilet soaps. Raw materials used in various stages of soap manufacture. EUGENE RIMMELL, LTD.—Various perfumes and toilet preparations.

PETER SPENCE AND SONS, LTD.—Alum and aluminium salts and their application in dyeing, leather manufacture, paper making, etc. A display of alum crystals, including one weighing 200 lb., titanium salts, sulphuric acid and other chemicals. J. AND E. STURGE, LTD.—Chemical products obtained from the grape and lemon (tartrates and citrates), precipitated chalks, potassium carbonate and other chemicals.

A Group of Chemical Visitors to Wembley

LEFT TO RIGHT: PROFESSOR DRUMMOND, MR. JULIAN BAKER, MR. J. CORBRIDGE, PROFESSOR HARDEN, DR. P. C. C. ISHERWOOD, MR. C. A. HILL, MR. W. J. U. WOOLCOCK, MR. F. E. HAMER, MR. A. ROSS MITCHELL, AND MR. G. C. PARNABY

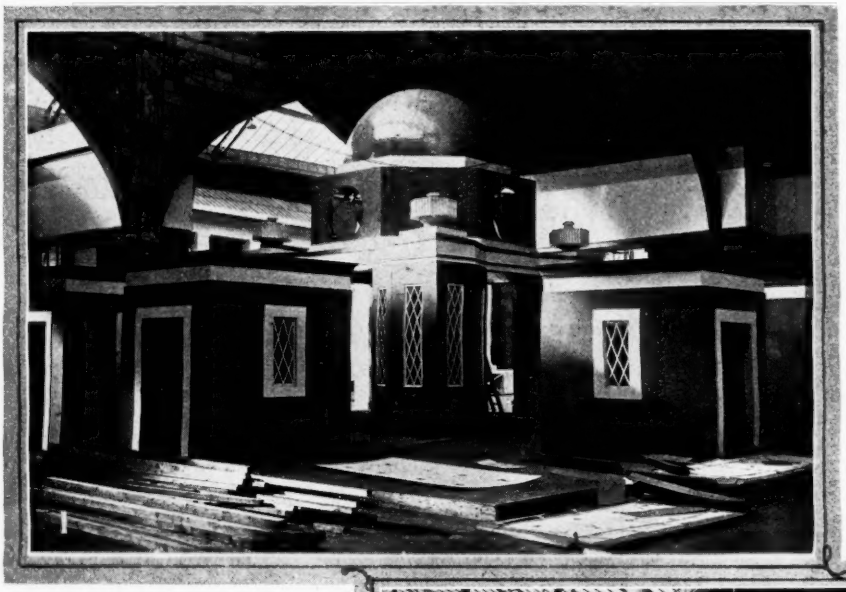
THAMER.—Cosmetics and lotions.

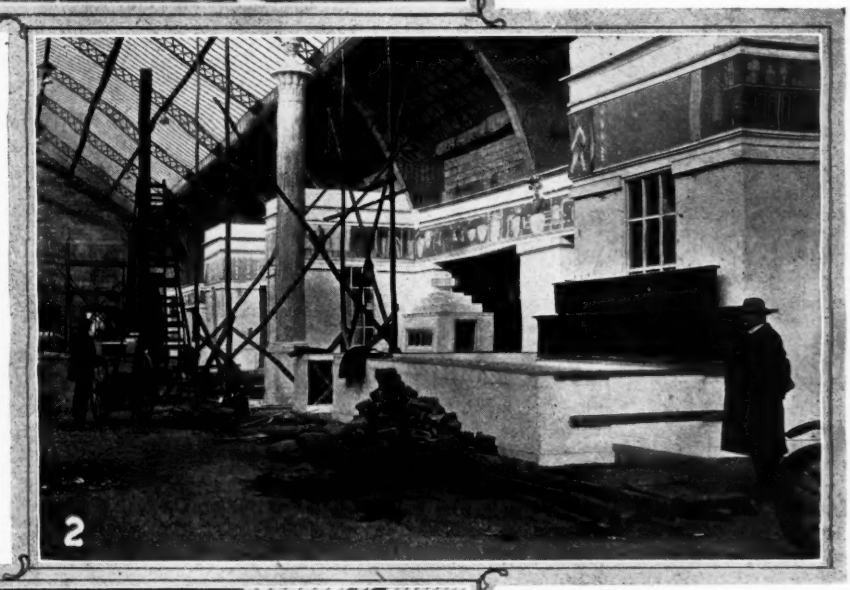
THE UNITED ALKALI CO., LTD.—Examples of the use of the firm's products in calico printing, dye making, textiles, paper and glass industries.

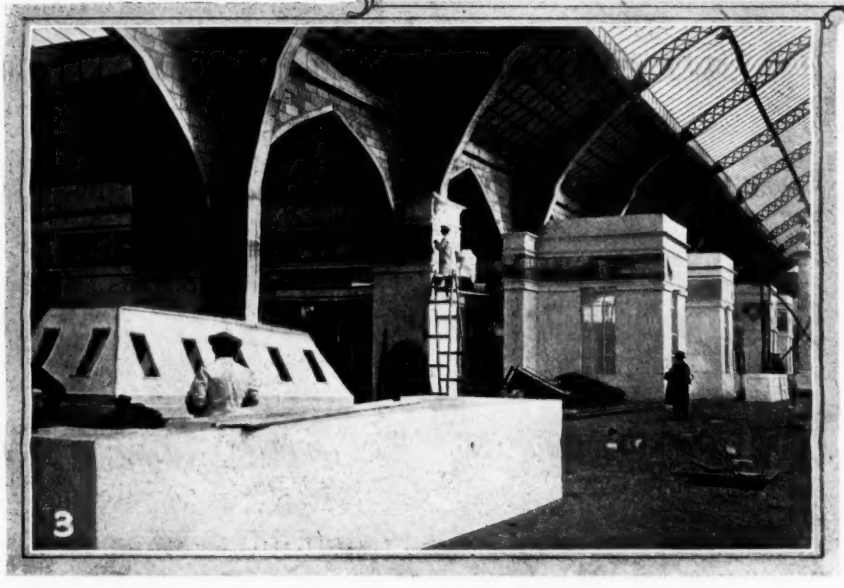
The WASHINGTON CHEMICAL CO., LTD.—"Pattinson's" magnesia, calcined magnesia for the rubber industry, etc., carbonate of magnesia, fluid magnesia, etc. JOSEPH WATSON AND SONS, LTD.—"Watson's Matchless" cleanser, "Nubolic" disinfectant soap, "Venus" toilet soaps, etc., and products from the firm's seed crushing mills, and their residuals such as feeding cakes. J. AND J. WHITE, LTD.—Chrome salts and their raw materials, bichromate of soda and potassium, "chrometan" liquor, oxide of chromium, and sulphate of ammonia. WILLIAMS BROTHERS AND CO.—Aniline dyes in dry form and in solution for various purposes including leather, confectionery, inks, varnishes, soap, and textiles.

A Series of Conferences

Wembley, throughout the whole period of the British Empire Exhibition, is to be the scene of a series of highly important conferences and congresses. These will be held in the four Congress Halls which have been specially built for







Views in the Chemical Hall

1. THE BRUNNER, MOND STAND IN COURSE OF ERECTION

2 and 3. VIEWS FROM MAIN AVENUE SHOWING WORK IN PROGRESS

the purpose at the north-east corner of the grounds. Each conference is being arranged by an appropriate Imperial or National organisation. Chief on the list are probably the Empire Mining and Metallurgical Congress, in which the principal organisations connected with the Mining Industry, the Institute of Mining and Metallurgy, the Institution of Mining Engineers, the Institution of Petroleum Technologists, the Mining Association of Great Britain, the Iron and Steel Institute, the Institute of Metals, and the National Federation of Iron and Steel Manufacturers are taking part, the first World Power Conference, which the British Electrical and Allied Manufacturers' Association is organising, and the International Advertising Convention which is to be held during July. The four Conference Halls, each of which is supplied with the necessary Committee Rooms, are now practically completed. They can accommodate respectively 120, 150, 550 and 1,800 people.

The list of dates which have been fixed for the various conferences includes the following:—The British Science Guild on "Science and Labour," May 30 and 31; The Chemical Association, July 10; The Institute of Mining and Metallurgy, June 3 to 6; The Faraday Society on "Physico Chemical Problems *relating to Textile Fabrics*" at the Imperial Textile Conference arranged by the Textile Institute, June 10 to 12; The Society of Dyers and Colourists, June 11 and 12, and The Society of Glass Technologists, May 27.

Sulphuric Acid Plants—Old and New

By P. Parrish, A.I.C., M.I.Chem.E.

We give below a summary of a lecture, illustrated by about 50 slides, delivered by Mr. Parrish to a meeting of the Junior Institution of Engineers, on Friday, March 21.

THE importance of the sulphuric acid industry, and its rapid development, may be gauged from the following figures, representing the world's production :—

	Tons.
1880	1,850,000
1892	2,818,000
1902	4,450,000
1909	8,000,000
1917	14,000,000 (approximately)

Spent oxide as a raw material has become increasingly popular, and its production has increased appreciably since pre-war years. This is evidenced by the fact that for several years prior to the war an average figure of the sulphur recovered per ton of coal carbonised was 7 lb. During the war as much as 17 lb. of sulphur were recovered, and even to-day the figure averages 12 lb. per ton of coal carbonised.

The popularity of spent oxide depends upon its ready combustibility, the ease with which it can be charged, the absence (speaking commercially) of arsenic, and the extent to which the sulphur can be eliminated as contrasted with pyrites. With the latter the cinders invariably contain 3 per cent. of sulphur, representing 2¼ per cent. of sulphur on the original ore, whereas the content of sulphur in burnt spent oxide, taking into consideration that which is fixed during the process of combustion, does not represent more than 0·5 per cent.

The absence of any "breaking" charges, such as are incurred with pyrites lump ores, and the lesser weight of residue to be handled—8 cwt. of residue per ton of spent oxide combusted, as compared with 15 cwt. of cinders per ton of pyrites burned—are all decided points in favour of the raw material arising from gasworks.

Moreover, it must be remembered that burnt spent oxides can be converted into a purifying agent, and can be activated by suitable means without incurring much expense.

Both shelf burners of the hand-operated type and mechanical burners are employed for the combustion of spent oxide. Generally speaking, from the point of view of labour, there is little to choose between the two methods. The advantage of hand burners is the absence of dust.

Mechanical burners must of necessity create dust, and however efficient the dust arresting devices may be, experience has abundantly proved that there is nothing to eclipse hand-operated spent oxide burners. Of course, it is conceded that with mechanical burners a better burning efficiency is possible, but this represents only a small saving, and it is generally believed that the greater reliability of hand burners, with the production of burner gases practically free from dust, is an undoubted factor in their favour.

[*Some interesting details with regard to the Wedge burner, its construction, erection, and working were afforded at this juncture.*]

The importance of a well-proportioned sulphuric acid plant cannot be over-emphasised. No amount of chemical supervision will rectify defects consequent upon a badly designed plant. A definite relationship must exist between the burners, the connecting flues, the Glover and Gay Lussac towers, and the chambers.

A symmetrical Glover tower, well balanced, and possessing the necessary characteristics in the matter of free space, and reaction surface, etc., is a vital necessity.

Hitherto, the basis on which Glover towers have been designed has depended upon a packed area of 4¼ square feet, at a specific part of the tower, per ton of mono-hydrated sulphuric acid manufactured per day. Similarly, where two Gay Lussacs are provided, these are based on 2¼—2½ square feet of packed area per ton of mono-hydrated sulphuric acid made per day. These figures disregarded the characteristics of the packing material, and hence were largely empirical. The author has attempted to place the basis of design on a much sounder and more scientific basis (*Gas World*, Coking Section, June–July, 1918). If the figures representing volume to give free space are multiplied by the figures representing volume to give reaction surface, a resultant, or index number is furnished, which, when considered in relation to the price, affords a ready and reliable guide to the selection of a filling material.

It will be appreciated that old standards need modification.

[*Here the lecturer outlined the directions in which modifications were necessary.*]

The Glover tower acts primarily as a denitrator, but also fulfils the *rôle* of a concentrator and maker of acid. The extent to which the two latter functions are performed depends essentially on design and the character of the burner gases which are sent forward.

With spent oxide the quantity of water, as steam, sent along with the burner gases, represents approximately 18 per cent. of the weight of the spent oxide dealt with; with sulphur only 1½ per cent.; and with pyrites about 1–2 per cent. On this account, the volume of gases is sensibly increased. This factor must be taken into consideration in connection with any design of plant.

Coming to the question of coke as a packing medium for Gay Lussac towers, it was emphasised that this material was the cheapest packing—with the premier index number. The disability with this filling is not so much one inherent in the coke, but arises largely from the operation of the sulphuric acid plant. With burner gases containing iron oxide dust, the Glover tower acid must inevitably contain iron in solution as iron sulphate. The solubility of this impurity decreases with an increase of concentration. Moreover, with increased concentration there is a tendency to the formation of basic ferric sulphate, which separates out at reduced temperatures. The temperature of the Glover acid leaving the coolers is not necessarily the lowest recorded. Indeed, the minimum temperature is generally to be found in the Gay Lussac tower. The deposition of basic ferric sulphate does undoubtedly occur at this point, and this is one of the prolific factors in causing a blockage of the cellular structure of the coke, and in impairing its efficiency as a satisfactory filling medium. If this difficulty is to be avoided, the temperature to which the Glover acid is cooled will need to be less than that generally prevailing. Certainly, 20° C. should be adhered to and not exceeded.

Propeller packings, Obsidianite and Accrington rings and glass, all serve admirably for Gay Lussac towers.

[*At this juncture the lecturer dealt with the chemistry of the sulphuric acid process, the construction of sulphuric acid plants, and the demolition and reconstruction of old chamber plants. All these aspects were admirably illustrated by slides. The final aspect is illustrated with one or two diagrams and views similar to the slides used.*]

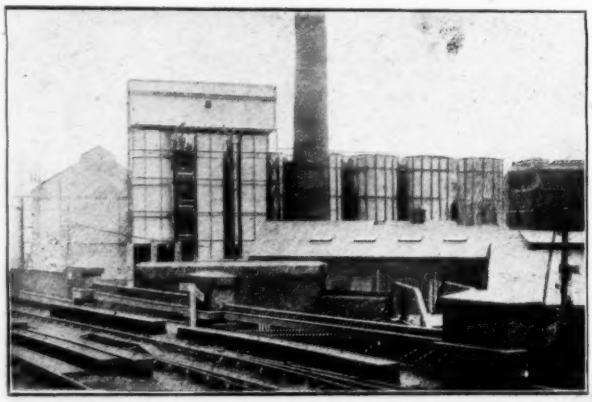


FIG. I. VOID TOWER CHAMBER. MORITZ DESIGN.

Developments in the Manufacture of Sulphuric Acid

Definite attempts to increase the productive capacity of sulphuric acid plants were made about 12 years ago.

The circular form of void tower chamber, Moritz design (Fig. 1), was introduced about that time. The design was directed to securing more efficient dissipation of the sensible heat of the burner gases, and the exothermic heat of the reaction by affording a greater exposed surface for heat transmission.

Practical trials, however, have demonstrated that the best that was possible with this type of plant, given a reasonable nitrate of soda, or nitric acid consumption, was 8 cubic feet of chamber space per lb. of sulphur per 24 hours. The absence of steady operation was a remarkable feature, even when working at the foregoing cubical capacity.

Prior to the introduction of the Moritz void tower chambers, the OPL system had been erected in this country, and there are several installations still in operation.

Fig. 2 shows a diagrammatic representation of this type of plant, the underlying principle of which constitutes a departure from the old chamber system. The latter contemplates gaseous reaction; the OPL system is based on the reaction of burner gases with a liquid—nitrosyl sulphuric acid of definite strengths—and the towers are packed to give the greatest possible wetted surface.

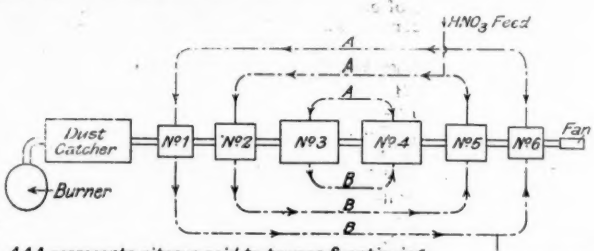


FIG. 2. THE OPL ACID PLANT.

It will be appreciated that tolerably large volumes of acid have to be circulated in connection with this system, but assuming a modern type of pump is used, the expenses incurred in such circulation need not loom unduly large.

Approximately 54 tons of acid are circulated per hour in an installation making 15 tons of 80 per cent. acid per day, approximately in the following proportions :—

Tower Nos.	1	2	3	4	5	6
Tons of acid	7	9	11	11	9	7
Approximate nitrosity—expressed in terms of ozs. of $NaNO_3$ per cubic foot of acid	Nil	0·97	1·19	12·25	10·25	7·35

It is seen from the latter data that approximately 5½ lb. of nitrate of soda are in circulation per 100 lb. of sulphur burned, and the nitric acid consumption, expressed as nitrate of soda per 100 lb. of sulphur burned, is 3·5 lb., i.e., 3·5 per cent.

The temperatures prevailing in the various connecting trunks of the towers are low, and are likely to assist in the preservation of the lead. It is the author's view that this is a type of plant which must be reckoned with to-day, by reason of its low capital cost, and the general efficiency and steadiness with which it works.

But the devotees of the horizontal system, where gaseous reaction is the fundamental principle, were undaunted. Improvements in the construction of the chambers were introduced (Fig. 3), directed to affording increased surface area for the dissipation of the sensible and exothermic heat of the process. Moreover, a distinct advance was made in the arrangement of plant, as is indicated in Fig. 4.

Both illustrations concern the Benker-Millberg twin system of intensive production.

With a single first chamber, it will be realised that there is a limit to the intensivity of the operations, beyond which increased production becomes prejudicial by reason of the increased temperature to which the lead walls are subjected. To overcome this limitation, Benker and Millberg suggested the adoption of two first, or leading, chambers, as shown in Fig. 4. By dividing the production at the initial part of the plant, it is clear that each chamber has less work to perform. The exothermic heat of reaction must be constantly dissipated by means of the radiant influence of the walls.

FIG. 3. IMPROVED HORIZONTAL CHAMBERS.

Calculations show, taking the co-efficient of the transmission of heat across the lead walls into consideration, that under given conditions the old single first chamber system will have a temperature of 85° C. in the first chamber, and with the twin system the temperature of the first chambers will be 77° C. The temperature difference is important, when it is remembered that the lead becomes soft with high temperatures, and the possibilities of distortion and potential wear and tear are augmented. Apart from this the reduction of temperature in the twin system is coincident with an increase of production.

It has been found that with 9 cubic feet of chamber space per lb. of sulphur burned per 24 hours, the Benker-Millberg system operates very efficiently, and without violent fluctuations.

The next development was the now renowned Mills-Packard system. Here a tower chamber in the form of a frustum of a cone is used, and is water cooled. Thus rapid removal of the sensible and exothermic heat is ensured. This system has been largely adopted, and, generally speaking, it has given satisfaction.

There is, of course, a limit to the rate of cooling. This is exemplified in the fact that in countries such as Russia, Siberia, and Scandinavia, it has been found necessary to house the sulphuric acid chambers. The disability which follows a too-rapid cooling (to which the Moritz void tower and Mills-Packard systems are prone) is that, due to exceeding the rate of reaction in the chambers, condensation of steam occurs, and a low specific gravity bottom acid may be produced.

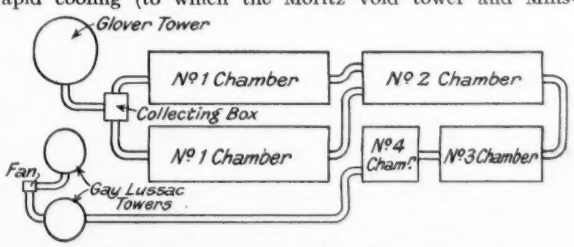


FIG. 4. INTENSIVE PRODUCTION OF SULPHURIC ACID. BENKER-MILLBERG TWIN SYSTEM.

Obviously, cooling must be subjected to well-defined control, so that it is compatible with the rate of reaction—and not in excess of it.

The time factor in the old chamber systems is approximately 144 minutes ; in the Benker-Millberg system about 70 minutes ; in the Mills-Packard plant about 40 minutes ; and in the OPL system approximately 24 minutes.

But there is no finality, apparently, to the rapidity of reaction, and it is known that two systems—the Parrish-South Metropolitan Gas Company, E.P. 156,328, with bubbler tanks, and the Schmiedel roller box—surpass anything hitherto known. In both these systems the reaction is between burner gases and liquid—nitrosyl sulphuric acid, of well-defined strength, but instead of film action, which characterises the OPL system, the Metro system provides for definite but attenuated bubbling, along with stirring, as the fundamental principle, whereas the Schmiedel system, by the operation of a series of undulated rollers, usually three to each box, driven at a peripheral speed of 5 metres per second, creates atomisation of the nitrosyl sulphuric acid, and admits of efficient contact between gases and liquid.

In these respective systems it will be appreciated that one of the underlying considerations is the extent of the horse power absorbed per unit weight of acid produced. The two systems bear a marked similarity in many features, and it is evident that the question of power has been independently but carefully considered by the respective inventors. Each system is calculated to work at a phenomenally low time factor of approximately 2 minutes. How the two latter systems and the OPL plant will compare in point of power consumption remains to be seen.

Is it cheaper to circulate acid and have film contact (OPL system), or is it cheaper to operate corrugated rollers absorbing about 3 h.p. per box (say, per 3½–4 tons of mono-hydrated sulphuric acid manufactured per day), and secure efficient contact between gases and atomised acid (Schmiedel system), or is it more economical to force positively the gases through an attenuated seal with the advantage of stirring in addition (Metro system) ?

It is certain that shortly the advent will be witnessed of much smaller units of plant, capable of being started and stopped without much difficulty or inconvenience, which will need very little supervision, that greater elasticity and reliability will be secured, and that capital expenditure will be very sensibly reduced.

The Salt Union and Trading Problems

Mr. George Henry Cox, J.P., chairman, presided over the 35th annual meeting of shareholders of the Salt Union, Ltd., held on Tuesday, at Liverpool.

Dealing with the company's trade in the East, the Chairman pointed out that the high salt duty in India, coupled with uncertainty as to its reduction, had lessened consumption, besides which competitors had shipped freely from Germany, Spain, Port Said, and the Red Sea. The company's shipments had exceeded those of 1922, but were still only two-thirds of those of 1913. With the exception of the company's specialities, efforts to ship to Canada and Australia, in spite of the small preference given to British salt, had been seriously crippled by high tariffs. " It is perfectly plain," the Chairman pointed out, " that the Dominions are determined to develop by means of high protective tariffs their own production of salt, which they are quite entitled to do if they think fit ; but this policy necessarily raised the cost materially to their own consumers, and in many cases the native salt cannot compare in quality with ours. It follows that the users are obliged to take an inferior article and at a higher price."

In the home trade there had been a further development in outside competition on the part of several firms who had started new works and resuscitated old ones. Hitherto efforts to bring them into line with the rest of the trade had not succeeded. There was no justification whatever for extensions of pannage on the part of either new or old makers, because it was notorious that the existing power of production was already far in excess of present requirements for both the home and export trade.

In order to acquaint the public with the supreme merits of their fine salt, unsurpassed, as regards quality and methods of packing, an intensive advertising campaign, the Chairman said, had been started in the press and by other means, by which they expected largely to increase their sales.

American Potash Production

The View of American Chemists

Germany's grip on the potash monopoly has been definitely broken by America and France, according to a survey by the American Chemical Society, who state that the United States has finally emerged as a potash producing country. Potash meeting the nation's agricultural need for purity is being made, and federal and state experiments to ascertain how far borax, inherent in American potash, is beneficial to crops are under way. An American investigation of French potash activity in Alsace shows marked advances both in business management and technical skill. The United States, it was stated, is producing potash superior to that of other nations, and at a cost far lower than during the war. Americans are now buying up their own potash production before purchasing abroad.

The attitude of American chemistry toward German competition has been summed up by Dr. John E. Teeple of New York, treasurer of the American Chemical Society, who said : " Both French and American production of potash are here, and here permanently. There is no longer a German monopoly. Germany can be entirely shut off and the world can be supplied from other sources. The assertion of Germany's ability to starve any part of the world, or feed any part of the world she chooses, is now only an empty boast, as the world can now entirely feed itself without the help of her potash."

The Effect of Borax

" In quality, American potash is now second to none, yet there are those who prefer to encourage the potash production of Europe rather than that of the United States, and these critics have made great use of various statements published in the past on the toxic influence of borax in fertilisers, since the first potash put upon the market from Searles Lake did contain a somewhat larger percentage of borax than experience has since proved to be desirable. Research has made it possible to remove this excess borax from American potash, our post-war experience now clearly showing that small quantities of borax are not always harmful to plant growth, but in some cases have even been found beneficial. There is no doubt that if borax were present in large quantities it would act as a poison, but in the potash now being produced there is not sufficient borax to produce a toxic influence. It should be remembered that almost every poison is a stimulant when used within narrow limits.

" American potash production having reached the stage where danger is eliminated, the question now is : ' How much borax can be used to advantage as a stimulant ? ' After investigation, the Department of Agriculture set a limit of two pounds of borax to the acre as being entirely safe for crops. On account of the research work that had been done, it was easy for American producers to meet this requirement. Further, in freeing potash from borax, the latter has been developed as a valuable by-product. It is in the interest of the manufacturers to remove the borax because of the favourable market which it commands, bringing a price of two and a half times as great per pound as potash.

The Growth in Production

" In 1915, the first year in which the United States made potash in sufficient quantities to be recorded, the output was about 1,000 tons of pure potash. Now, despite the post-war slump, the production is about 30,000 tons annually. Potash production in the United States reached the peak in 1918, when 54,000 tons were manufactured. And this progress has been made despite the fact that of the 128 producers in 1919 but one is left whose main product is potash, the remainder of the American supply being by-product. This single concern, principally English-owned, is now operating successfully at Searles Lake, California.

" Potash is one of the few commodities that is cheaper now than it was during the war. One of the most encouraging features of the present situation is that this is the first year in which American buyers took up all the domestic supply before buying abroad. The United States now uses about 250,000 tons of potash per year. Of this total, about ten per cent. is produced at home. Potash is now worth about $60 a ton. During the war it brought from $300 to $400 and over per ton.

Markets for British Chemicals Overseas

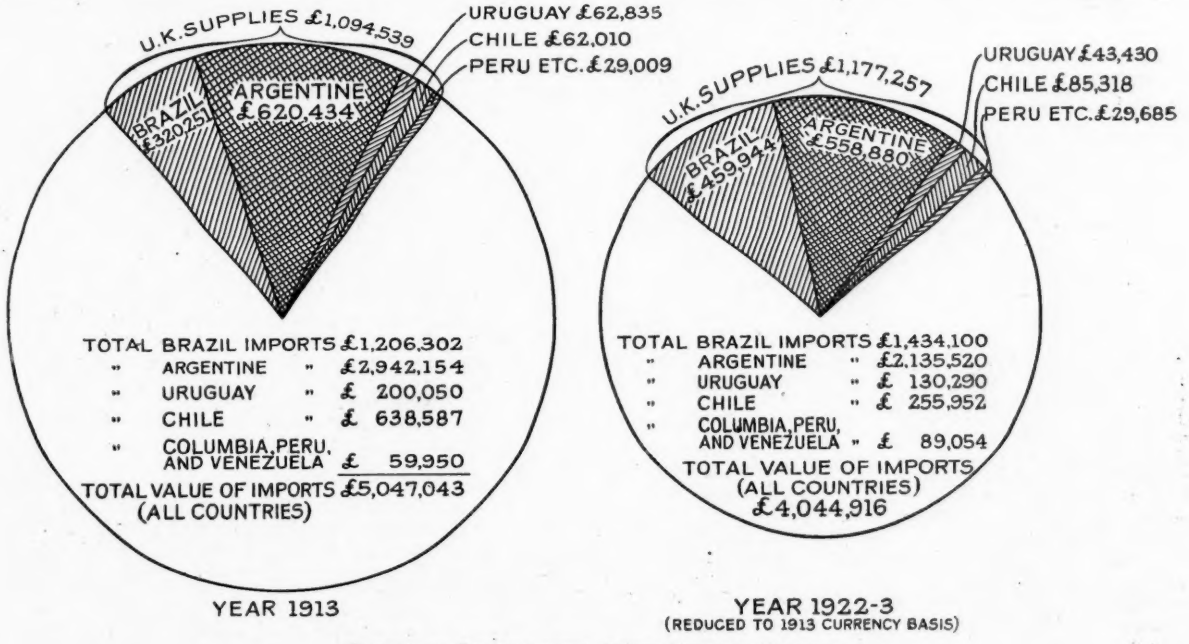
The Position in South America

The following article, prepared specially by our Statistical Bureau, deals exhaustively with the position of British Chemicals in South America before and after the War.

THE very welcome expansion in our export trade of chemicals and allied products, as shown by statistics for the past twelve months, is a significant indication of reviving business throughout the industry, and in view of the fact that our total overseas supplies, after a sustained annual increase during the past three years, are now approaching the pre-war position, it may be accepted as almost without question that the slump in trade has been passed, and that we are once again assuming a satisfactory altitude in the markets of the world, after recovering the inevitable loss of our position consequent upon the war period. Investigations by our Statistical Section show that the total British exports of chemical manufactures, measured by value, during the past year, reflect a 25 per cent. increase over the previous period and nearly 50 per cent. more than recorded during the year 1921, whilst inclusive of dyestuffs and painters' colours, the expansion for 1923 is more than 25 per cent. over the year 1922 and is approximately 33 per cent. greater than our supplies for 1921. When regard is had to the fact that these results leave out of account the increasing value of British currency, it is evident that actual developments are even still wider. World markets in all directions tend to assimilate pre-war conditions, and in no case is this better demonstrated than by the countries of the South American continent, which are returning to their former suppliers, after enduring the transitory influence of competitors who were able to enter these markets at will during the period subsequent to 1914. If for the purpose of illustration we accept all these countries, despite their enormously diverse climates and conditions, as being one trade direction, a glance at the diagram below will serve to give an idea of the comparative scope of these markets at the two dates mentioned, and also enable one to visualise the relative importance of individual countries within the South American area. The figures for the latter period are entirely provisional, as owing to the difficulty which these countries experience in obtaining statistical information, their total imports have yet to be confirmed as absolute, but from information supplied by the Department of Overseas Trade, together with reports specially furnished by commercial representatives of this department in these countries, it is certain that the actual minimum of £1,765,883 for the year 1922-3 represents an advance over the aggregate for the preceding twelve months of £353,000, and emphasises the important recovery which is being effected in this direction of export trade; and since this is one of the newer areas of the world whose development in the past has been retarded by economic troubles which are now disappearing, the attention of chemical and dyestuff exporters may be beneficially focussed here.

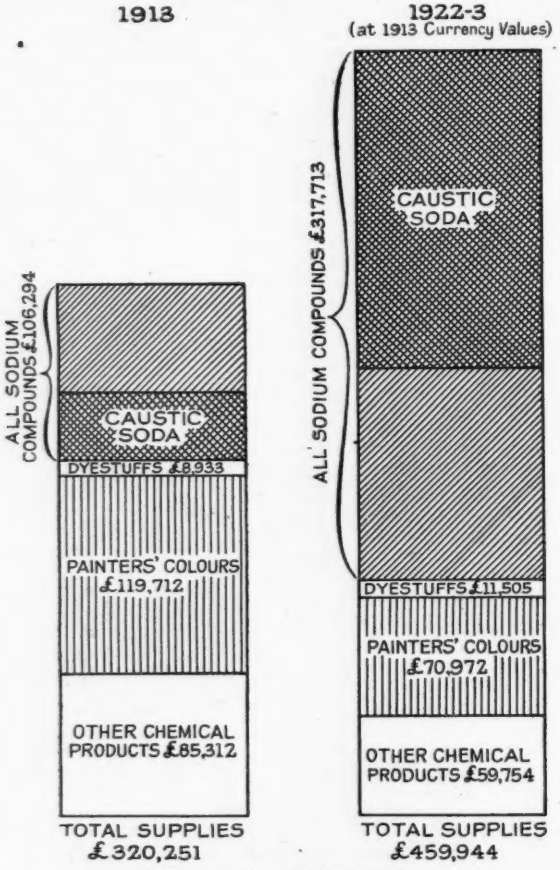
Brazil

As the leading country of South America in regard to textile manufacture, Brazil may be regarded as the best field in the continent for the development of our dye trade. The textile industry is now the most important in Brazil and its annual output is calculated as being equal to that of all other industries taken together. During the war and the subsequent period this industry grew considerably and in consequence the market for aniline dyes is rapidly assuming importance. For supplies of this product, Great Britain is showing greater proportions, but active competition from Germany is reported, especially in the Pernambuco district, for whereas during the twelve months ending June 30 last the United Kingdom sent a total of 1,100 tons for dyestuffs of all kinds, which included 9 tons of aniline dyes, imports from Germany in connection with aniline alone attained a figure of 572 tons. Since then the position has to some extent changed, by reason of the fact that imports from our rival are now regarded as a speculation in exchange and that, on the average, our C.I.F. dye prices are relatively lower. In this connection it is worthy of note that practically the whole of our South American dye trade is concentrated on Brazil. As regards total chemical supplies, another important competitor which has stepped in of recent years is U.S.A., but latest reports indicate that not only are we regaining the pre-war position, but also that the Brazilian chemical market, as portrayed by the diagram overleaf, has expanded favourably for supplies from Great Britain. Of the leading products which constitute this increasing trade sodium compounds are prominent, as reflecting a total of 25,567 tons at the latter period, compared with 15,739 tons during the pre-war year. The main individual item in this group is



IMPORTS OF CHEMICALS INTO SOUTH AMERICAN MARKETS

caustic soda, of which we now send double the quantity supplied in 1913—the increase being over 7,000 tons to the present aggregate of 14,362 tons, valued at more than £400,000 (c.i.f.) but which, nevertheless, represents only 66 per cent. of absolute requirements in this market. In certain directions our enterprise could possibly be extended, for the German *Statistisches Jahrbuch* shows a falling off in supplies from that source, in connection with prepared potassium nitrate, from 859 tons in 1913 to 18 tons in 1922 and of superphosphates from 4,222 tons to 245 in the same period. The demand for chemical disinfectants and insecticides is one which is reported to be on the increase in pastoral areas of this vast country, and though our supplies in this direction are now 250 tons per annum—much in excess of the pre-war figure of 84 tons—there is room here for bigger business, as well as also for chemical manures, of which latter we export but 5 per cent. in a



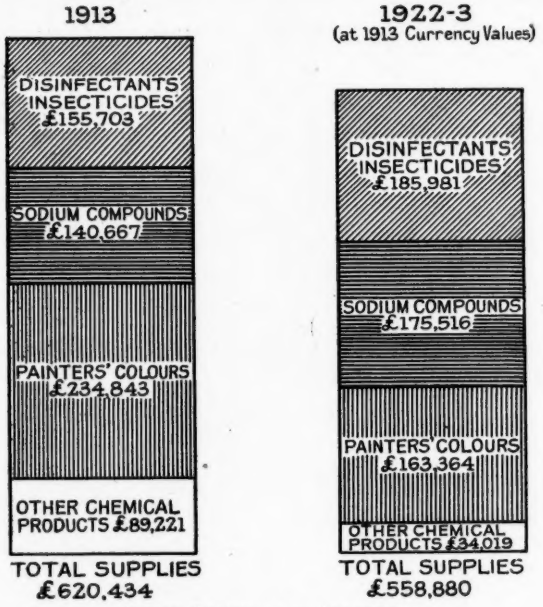
BRITISH CHEMICAL IMPORTS INTO BRAZIL

market of over 4,000 tons, though practically all other exporters to Brazil in this line are located in Europe. The needed attention to the scope for potassium nitrate is emphasised by the fact that whilst Brazil is still our best customer for this commodity, yet the latest total of 89 tons, taken from Great Britain, does not compare favourably with the pre-war total, which was almost 100 per cent. larger. Painters' colours are another item which exemplify a loosening of our hold in this market, for despite increasing improvement in our supplies during the past three years, present exports from the United Kingdom are only in the neighbourhood of 1,800 tons, whilst 3,477 tons were consigned during the year 1913. This falling-off is shown chiefly in white zinc paints, where Belgium is now our leading competitor, for in regard to white lead our position has been well maintained. As examples of products of which only negligible quantities are at present exported by us to this area, may be quoted heavy coal-tar oils, muriate and nitrate of ammonia and various types of acids, although fair quantities of sulphuric, boric and acetic acids are taken. The general tenor of the Brazilian market may be regarded, however, as being distinctly in favour of British products, and since during the past year importers have been handicapped by fluctuating exchanges, the presence of the British financial mission in the country with a view to strengthening the economic position should go far to improve the future possibilities of purchases from the United Kingdom. Whilst internal stability has been effected, the last twelve months have not witnessed any irritating tariff changes, and the recovery of the chemical trade is indicated by the statistics of the year 1922–3, which show quite well against the 26,676 tons taken from us in 1921-2 and the 10,100 tons during the year 1920–1.

Argentina

The Argentine market must be approached from the point of view that it is not at present a manufacturing area so much as an agricultural and pastoral expanse. This year, for instance, the cereal harvest assumes importance with its immense proportions, but, on the whole, the great dominant factor of Argentina economics is the pastoral industry. For this reason it is well to note the dominating position we have obtained in this market for disinfectants and insecticides, and also that Argentina ranks as our leading customer in this respect, taking as much as 60 per cent. of our total world export. During the period 1922-3 Germany, however, began to offer greater competition with her supplies of 1,682 tons, which were in excess of pre-war imports from this source by 360 tons. Outstanding comparison in our favour is shown by the 1913 British aggregate of 6,223 tons, valued at £155,703 on import into Argentina, and the total for 1922-3, which was approximately 5,500 tons, with a value of £265,600. Another line for which Argentina offers conspicuous demands, which prior to 1914 totalled 658 tons, is tartaric acid, of which quite 30 per cent. of our total world exports before the war were despatched to the Argentina, which was in consequence our best customer to the extent of 243 tons. The position at present is not so sound from our standpoint, for, although the country still takes the leading quantity of this product, nevertheless the total supplied by Great Britain for the twelve months 1922-3, reaches only 50 per cent. of this figure and is exceeded by the German supplies of 155 tons. In another direction in which ground has to be regained, there are heavy coal-tar oils, for which Argentina was our best customer to the extent of 1,850 tons, and now shows a total of less than 530 tons. Similar decline, also, in consequence of the general trade slump, is reflected in connection with sulphate of alumina, for which Argentina, however, remains as our leading customer, which fact is all-important in view of reviving interest. Taken altogether, this market offers much encouragement, since it has maintained itself as our predominant trade direction in the South American Continent, in spite of the trade paralysis which has afflicted it during the past few years, and has increased its chemical imports from 24,692 tons in 1921 to 28,074 tons for 1922, and 35,092 tons during the period 1922-3. This is reflected in the compounds of sodium, which expanded during these periods from 15,049 tons to 17,453 tons, and thence to 22,316 tons. Recovery is therefore proceeding on a satisfactory basis and evidences the return to chemical imports from the United Kingdom in replacement of many foreign products which entered this market during the war period. That further progress is, however, possible may be gauged from the following diagram, with its suggestion of an aim at our pre-war capacity.

One of the outstanding features of the Argentina purchases is the good quantity of painters' colours which are annually taken from the United Kingdom, and now amount to 4,400 tons, making this country our second-best customer, and the important position of Argentina amongst the other South American countries is shown by the lead held in connection with supplies of ochre and earth colours, and also those ground in oil. The market in this respect is therefore developing, but has yet to attain the pre-war aggregate of 6,544 tons. In regard to chemical fertilisers there can be little doubt that good business in Argentina will result during the present year, for, whilst the recent revision of the tariff has given a 5 per cent. *ad valorem* duty on various chemicals, fertilisers are to be admitted absolutely free, alongside of the necessary implements, with a view to stimulating agriculture within the country, and the export trade of Great Britain may well benefit by attention to this factor.



British Chemicals in Argentina.

The other directions in which British chemicals do relatively less business than our competitors are in connection with ammonium salts, together with oxalic and salicylic acids and also chromate of soda.

Uruguay

The Uruguayian market for chemicals is not nearly so well developed as that of the Argentine, but reflects a useful annual demand for 3,300 tons at present, which, coupled with reports of gradual improvement in economic conditions within this country, are signs that the bad period is being left behind. Before the war total receipts from Great Britain reached 6,156 tons, valued at £62,835, of which £4,396 represented supplies of copper sulphate. Disinfectants were worth £7,287, and sodium compounds were in the aggregate £15,493. Latest annual statistics show that sodium compounds have been well maintained at £19,012, and that copper sulphate is still an outstanding item at £6,394, but that increased competition in the supply of disinfectants and animal washes has succeeded in reducing British exports of these lines to £792. This is a matter of consideration in connection with a country such as Uruguay, which is almost exclusively concerned with cattle-raising, and from whence at the moment, according to reports, dips and washes are in request. This country, with its staple product of meat, is now entering more fully into its old markets, with consequently increased buying powers and stronger financial position, so that the decline in imports of painters' colours from Great Britain may be expected to improve from the 433 tons of 1922-3 to our pre-war supply of 1,132 tons.

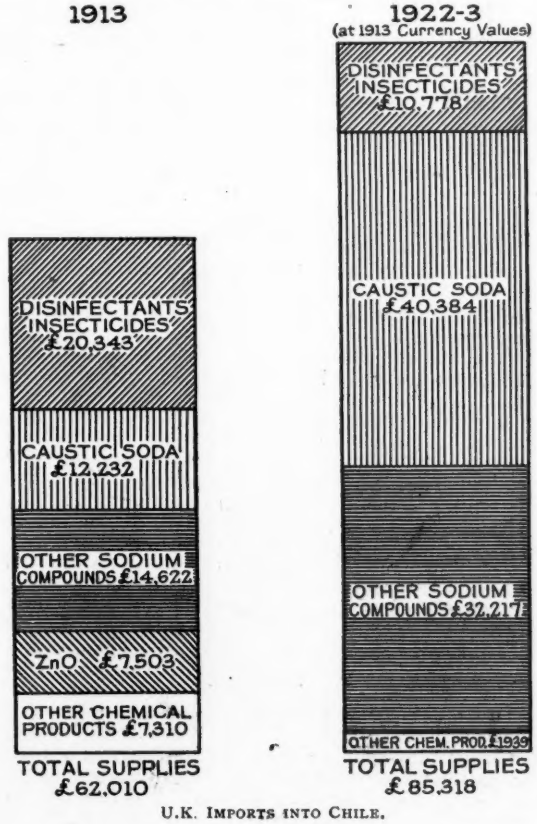
Chile

Chile is in the quite interesting position, from the point of view of our industry, that her main export is rough saltpetre, and yet imports annually from the United Kingdom good totals of chemical manufactures, which, before the war, weighed 7,252 tons, and during the twelve months of 1922-3 reached 5,648 tons, with a value of £102,381. Moreover, important expansion is being effected in imports of caustic soda from Great Britain, which, standing at present at nearly 2,520 tons, represent double the quantity supplied by us in 1913, whilst our aggregate supplies of sodium compounds now reach 5,648 tons, and reflect an increase of 331 tons during the same period. Chile has been badly affected by the stagnation which set in in her nitrate trade, but reports now speak of a general upward trend, and with gradual revival must come increased business for British exporters.

To some extent the enlarged imports of caustic soda are offset by declines in other products, which have not attained their pre-war importance, and notably in this respect are painters' colours, of which we now send annually 1,157 tons whilst the pre-war quantity was 2,840 tons. That this is an important feature in Chilean requirements, and therefore a line in which better business may be anticipated, is evident by the fact that Chile still leads other South American countries in demand for lead and zinc white, and basic lead sulphate, and is second only to Argentina in purchases of colours ground in oil.

Colombia, Venezuela and Peru

If we accept as one market the North-western Coast countries of South America, such as Colombia and Venezuela, and include with these also Peru, we obtain a trade direction now valued at £35,622 for chemical manufactures annually sent from the United Kingdom, which, with a weight of 548 tons, is a movement in the right direction, as shown by the improvement in statistics over the corresponding period of 1921-2, which recorded 503 tons. The leading country of this group in regard to weed killers and insecticides is Colombia, which shows good development over the pre-war quantities taken from the United Kingdom, and now receives an aggregate of £5,637 per annum from us. The other outstanding product which goes to this area is sodium cyanide, with 62 tons supplied, at a value of £7,455, after taking from us previously, in the year 1920, 135 tons, calculated at £18,451. Reports from Venezuela are optimistic and refer to trade of the past twelve months as being comparatively good, although complete statistics for this period are not yet available. The market in fertilisers is now being inadequately supplied, so that these are much in demand, and with the major part of the population engaged in agriculture, this product is capable of bigger business, since local feeling is very favourable to chemical products of British origin. These important factors in our trade are illustrated by annual demands from us of over £5,000 into Venezuela alone, and with chemicals as one of the principal imports of this country, the United Kingdom ranks as the second largest supplier, being, of course, at a disadvantage by reason of the proximity of an important rival. Venezuela is a cotton grower on quite a considerable scale, and in consequence is developing manufacture of the



U.K. Imports into Chile.

finished cloth, with an accompanying need for dyes. Four centres in the country now have mills in operation, and expensive new plant is at present in course of erection by a British firm, so that with textiles on the increase the dye imports should receive added attention. Recent information from Peru points to the expansion of import facilities arising from a steadier exchange and recovery from trade depression, although U.S.A. is competing strongly in supplies of chemicals. The chief feature of our trade with this country is the extent of painters' colours imported annually from Great Britain, which in 1922—the last period for which returns are compiled—show just over £17,000, and registered a total weight of 370 tons, after attaining a figure of 837 tons during 1920 and 336 tons during the year 1921. The influence of this dullness of trade activity will, however, be but transitory, and the possible development during the next twelve months should go far to reach the pre-war requirements of this market, as shown by our supplies during the year 1913, amounting to 2,100 tons of painters' colours, valued at that period at over £25,000, and in zinc oxide, which was also sent to the extent of 108 tons.

To sum up the existing position in regard to South American chemical imports, it may be said that, viewed from the standpoint of a collection of markets offering potential expansion in various directions, this continent, although but indirectly affected by the war, has nevertheless suffered acutely from general trade depression throughout the world, but recovery is now being effected, and the enlarged nature of the demand reported during the period 1922-3, as compared with that of the year 1921, would seem to presage still further steps towards wider activity, with enhanced business for British suppliers.

The Superphosphate Industry

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the extremely interesting article by Mr. Ogilvie in THE CHEMICAL AGE of the 22nd inst., on "American Practice in the Superphosphate Industry," I should like to ask if the Americans have succeeded in overcoming the difficulty due to the caking of manures containing sulphate of ammonia?

Mr. Ogilvie states that the batch mixer mixes the compound fertiliser and delivers it into weighed sacks. In usual practice it is necessary to allow a mixed fertiliser containing sulphate of ammonia to mature in the heap from four to eight weeks; it is then pulverised and bagged.

I should like to know whether it is possible to mix such a fertiliser and bag it up at once?—Yours, etc.,

LEONARD CARPENTER, B.Sc., A.I.C.

143, Palmerston Road, Bowes Park, N.

March 24, 1924.

The Use of Fertilisers

IN an address on the subject of "Development of International Trade in Agricultural Products" to the Aberdeen Business Club, Professor Hendrick, Aberdeen University, showed the great part that Britain played as a pioneer in the manufacture, commerce, and use of such fertilisers as guano, superphosphate, nitrate of soda, and sulphate of ammonia. Though France, Germany, Italy, Belgium, and the Scandinavian countries all now used artificial manures, Russia was only beginning to use artificial fertilisers before the war. So comparatively small a country as Japan imported and consumed far greater quantities of fertilisers than the whole of Russia. What Japan had done, the far greater country of China might also do in the near future. In the United States only a few States in the east and south-east were yet consumers of any great quantity of fertilisers, but every year the consumption increased. Canada, the Argentine, and Brazil were other great countries of immense possibilities, which as yet consumed almost no artificial manure. The conservation of a sufficient supply of fertiliser for this country in the future, the development of the Empire's fertiliser resources, the promotion and capitalisation of new fertiliser industries, and the development of trade in fertilisers with new and developing countries were all matters which demanded the consideration of a new and more scientifically trained generation of statesmen, business men and financiers in this country.

British Chemical Industry To-day

By W. J. U. Woolcock, C.B.E.

The following article by the General Manager of the Association of British Chemical Manufacturers appears in "British Industry, 1924," a review of the year issued by the Federation of British Industries.

THE present position of the British chemical industry is one of great interest, as it exemplifies one of the industries which has weathered the storm following the post-armistice boom. The past year has been one of steady, although necessarily slow, progress. Business is still on the small scale, but is decidedly better than last year, and if the industry is looked at as a whole there is cause for satisfaction in the recovery which has been made and no reason to forecast a setback in the coming year. The progress of the various sections differs in degree. The sulphuric acid industry, for example, is working at rather over 60 per cent. of its plant capacity, and owing to the wisdom of its leaders the improvements made in the technical control of the plant have been turned to good account and the position has been stabilised. An increased demand for acid would have an immediate and beneficial effect on the whole of the industry.

The alkali industry, which has just celebrated its centenary, has consolidated its position and retains its pre-eminence.

The slackness in the textile industry, which has had marked effect on the dyestuffs industry, has also been felt very acutely in the alkali industry, but has not been sufficient to shake its fundamental soundness.

The position with regard to tar and intermediates is not perhaps quite as satisfactory as it might have been, but the progress made is noteworthy and some of the most difficult features have been overcome.

In the dyestuffs industry a new set of problems have had to be faced. The demand from the colour users has been very restricted, but between 80 and 90 per cent. of this demand has been met from British sources, and the prejudice in favour of foreign dyestuffs has in some measure been overcome. The constant propaganda put out by those whose business it is to sell foreign dyestuffs has not swayed those of the users who are desirous of seeing the dyestuffs industry established in this country if it can be done at a reasonable price. The chief difficulty is not a technical one but is economic. On the one hand there is an enormous plant capacity put down during the war, leading to heavy capital expenditure; and on the other there is the absence of anything like the pre-war demand for quantities of dyestuffs. The two factors have handicapped the dyestuffs makers very considerably, and it is to their credit that they have attempted to reduce prices at the expense of their shareholders by making little if any profit, and in most cases, indeed, have made a heavy loss on the year's trading.

The Effect of the Ruhr Occupation

The position in the Ruhr has complicated matters very considerably. On the one hand it has undoubtedly led to a small increase in business, but the action of the French in seizing 7,000 tons of dyestuffs held out possibilities of considerable damage if these dyestuffs were flung on the world indiscriminately at any price which they would fetch. This apparently is not to be done, and when the requirements of France have been satisfied the amount which is left over may not perhaps have such an appreciable effect as was at one time contemplated. In the meantime those quarters of the world which have been temporarily shut off from German supplies have turned to Great Britain for assistance, and these orders have given a stimulus to the British dyestuffs industry. It is perhaps wise to emphasise the temporary character of this stimulus which is well recognised in the industry, and not to count too much upon it. The British dyestuffs industry can never hope to reach its most economic production until the textile industry is in a better condition, and this again is dependent on a world recovery, which at the moment seems very distant. It is a question of economically adapting a necessarily diminished output to meet the restricted demands of foreign countries.

The trouble in the Ruhr does not seem to have affected the fine chemical industry in just the same way as in the dyestuffs industry. There has been a steady increase in the number of fine chemical products which are being made in Great Britain, and there is an

increasing appreciation on the part of scientists of the quality of the British products. Here, again, the greatest difficulty with which the industry has been faced, apart from the question of exchange, has been prejudice unconsciously exhibited for foreign products, but constant demonstration of the excellence of the British article is wearing down the parrot-like repetition of a creed which has outlived its use.

Chemistry at Wembley

At the British Empire Exhibition (1924) in the Chemical Hall within the Palace of Industry, every branch of the industry will be represented by exhibits from the leading chemical manufacturing firms in the country. A space of about 40,000 square feet has been taken for this purpose, and within it the various branches of the chemical industry, such as the sulphuric acid, alkali, tar, intermediates, dyestuffs, fine chemical, soap, ammonia, and wood distillation industries, will here, for the first time in all their completeness, be illustrated to the public. The newest products in each branch will be given a prominent place. But even better than this, arrangements have been made to show that the science on which the industry is based has not only made enormous strides during the past decade but that there is, and always has been in this country, the spark of genius which has led to great inventions, which in their turn have enabled us to found and maintain a great industry. This is perhaps even more essential at the present time than at any other period of our history.

In order, therefore, that there may be no doubt as to the permanence of the British chemical industry in its present complete form, in the Scientific sub-section there will be shown illustrations of the discoveries which have recently been made in the realm of pure science in order that everyone may see that the stream of invention in this country continues to flow unabated, and that there is a guarantee for the continuance of an industry which is based on such invention.

British Goods Abroad

Suggested Commission on Selling and Advertising

In a statement recently issued in connection with the British Empire Exhibition and the development of overseas trade by the Lord Mayors of Liverpool, Bradford and Hull, the Agents-General for South Australia and Western Australia, and by a number of prominent business men, including Sir Woodman Burbidge, Sir Robert Hadfield, Sir William Noble, Sir Lawrence Weaver, etc., it is pointed out that the only permanent cure for unemployment is to increase the demand for labour, which is the same thing as to increase the demand for commodities. Such increase, to be beneficial, must come, in the first instance, from overseas. Increased consumption of British manufacture abroad requires in their judgment an intenser study and practice of efficient methods of selling and advertising, and for the following reasons :

(1) The cost of advertising staple commodities is provided by the reduction of overhead charges per cent. of output. By means of advertising, the rate of production is increased faster than the expenses of rent, depreciation, rates and taxes, and other fixed outgoings ; and the difference pays for advertising expense and interest thereon, and for a just compensation for any risk incurred.

(2) Some of our manufacturers advertise extensively in foreign markets, and, as they do so continuously, must be obtaining a profit. But before the increase of export trade in general can affect the labour market appreciably, it is necessary that their example shall be widely followed. Dubiety concerning the risks and difficulties involved prevents this ; and arguments in favour of it lack the general confidence required for effective action. Yet the experience of manufacturers who have advertised abroad is favourable whenever their procedure has been efficient, and has been preceded by proper inquiry to ascertain the conditions prevailing in different markets, and the local prejudices which require to be considered.

It is therefore suggested that a Royal Commission on Selling and Advertising in Foreign Markets might with advantage be appointed. Such a Commission should hear the evidence of manufacturers and others having knowledge of the matter, and the evidence of avocational witnesses could be tested by something in the nature of cross-examination. The public nature of these proceedings would elicit information not otherwise easily collected, and would have practical results beneficial to British trade.

The year 1924 is especially suitable for such an inquiry, as in July an important international gathering of advertising men is to take place at the British Empire Exhibition, and the opportunity could be taken to hear evidence from some of those attending. Several thousand men of practical experience have engaged themselves to attend, including 1,500 from the United States ; and the Convention is being promoted by the Associated Advertising Clubs of the World, representing the advertisers of both hemispheres. It is of the utmost importance that Great Britain should become aware of the most skilled and scientific merchandising methods. The following extract is taken from the report of Lord Linlithgow's Committee which considered agricultural problems, but the words touch other industries :

" In the new circumstances of world competition a knowledge of the marketing and distributive processes is essential to the producer. Only when thus informed can he adapt his methods of production, the goods he produces, and the preparation of these goods for market, to the needs of the buying public."

The British Industries Fair, 1924

Work of Construction now in Progress

In the opinion of many prominent business men the coming months will see a remarkable renaissance in British home and export trade. The exhibitors at Wembley alone will be the means of attracting an unprecedented number of business men to London from all parts of the world. In addition, the British Industries Fair, to be held at the White City, London, and at Birmingham, from April to May, should result in a record number of orders for British firms. Work is now in progress on the actual erection of this year's Fair, which as in the past is being organised by the Department of Overseas Trade. The London Section of the Fair will open on April 28.

Since its inception in 1915 the Fair has grown very considerably, and has now come to be recognised by buyers in all parts of the world as one of the most important events in their commercial calendar. At it they are enabled to see exhibits of almost every British industry under one roof. A number of firms in almost every industry who have participated without a break since the Fair's inception, have come to regard it as the most valuable place at which to exhibit new lines and novelties designed for export. Such novelties will be particularly numerous at the coming Fair.

Record Attendance Expected

The interest the Fair has excited, especially from buyers overseas, is evidenced, not only by the record number of pledges to attend, but by the fact that many buyers will be coming from countries which have not been represented at previous Fairs. Ecuador, Syria, China, Algeria, the Canary Isles, the South American Republic, and a score of other remote places, in addition to those better known commercial countries who are represented every year, will be represented at the forthcoming Fair, and leave no doubt of a record attendance of visitors anxious to place orders for British goods.

A significant feature of trade prospects is the study made by many leading British firms of current prices and conditions in the markets from which numbers of buyers will be coming to the Fair. It has sometimes been said in the past that British manufacturers stood alone in regard to quality but that an innate conservatism prevented them from meeting the needs of foreign markets. However true that may have been in the past it does not apply to the representative manufacturers of to-day as is shown by some of the lines to be exhibited at the Fair. In the past British quality has been sufficient to sell goods in the face of almost any competitive prices. The shortage of money since the War seriously impaired this asset. It is therefore doubly encouraging to note that British manufacturers as a whole have retained all their old quality, and are able to offer their goods at the coming Fair at prices which will compare favourably with those of almost any other foreign country.

Firms who are desirous of exhibiting at the coming Fair, and have not yet booked space, should communicate at once with the Secretary, the British Industries Fair, 35, Old Queen Street, Westminster, S.W.1, who will do everything possible to arrange accommodation, but no time should be lost.

Reviews

THE ELECTRONIC THEORY OF VALENCY. A General Discussion held by the Faraday Society, July, 1923. London: Faraday Society. Pp. 94. 10s. 6d.

THE PHYSICAL CHEMISTRY OF THE PHOTOGRAPHIC PROCESS. A General Discussion held by the Faraday Society. London: Faraday Society. Pp. 166. 12s. 6d.

The title "Discussion" as applied to these books is somewhat misleading, for each of them is a collection of monographs which give the well thought out views of a number of the world's greatest authorities on these subjects, whose views were, of course, well known before any of these "discussions" took place, and the minute portion of these volumes which is devoted to discussions—which again are sometimes not made impromptu—must be considered in this light.

1. *Electronic Theory of Valency.*—The names of Sir J. J. Thomson and Sir William Bragg—these giants of modern science, as contributors—are alone quite sufficient to warrant high expectations, and these are fulfilled. At the same time the volume is not for tea-time reading, as every page means hard study. Its concise style by no means facilitates the perusal. It gives the first complete symposium of what has been done on the subject, and the directions in which the new conception of the atom has been applied in various branches of chemistry. Most chemical theories during the past 100 years have found a "touchstone" in organic chemistry, on account of the facility with which complex and variously arranged configurations of carbon atoms can be constructed. The same holds good for the Electronic Theory of Valency. Looking through this book we find references to the work of Lapworth, Lowry and others, who not only found that numerous known bodies fitted in with their theories but, what is more remarkable still, correctly predicted the behaviour of substances, which have subsequently been discovered. A considerable portion of synthetic chemistry will no longer be directed to establishing rules with regard to specific gravity, refractive indices, rotation, etc., of individual substances, but to the much more important and interesting work of elucidating the internal structure on which these properties depend. We frequently hear the question "What is the use of the preparation of innumerable organic derivatives?" These discussions give one answer. From the remarks made by Bragg, Bury, Burckhardt, Flürscheim, Fowler, Garner, Heilbron, Henri, Henstock, Kenner, Lapworth, Lewis, Lowry, Norrish, Noyes, Robertson, Robinson, Rideal, Sidgwick, Thomson and Thorpe, it is clear that not only will every well-studied organic substance be found useful for the understanding of molecular configurations, but thousands upon thousands of more compounds will have to be studied, in order to give us a complete picture of inter-atomic relations.

2. *Physical Chemistry of the Photographic Process.*—This volume is, if anything, more specialised than the previous one, although a few chapters of it will prove of general interest. These are "The Photographic Chemistry of Gelatine," by Sheppard, Elliott and Sweet; "The Theory of Photography," by Bancroft; and "Future Problems in Photography," by Plotnikov, apart from smaller contributions by Dr. Slater Price, Sir Robert Robertson and Professor A. W. Porter. From the last three gentlemen, however, we should have expected much more detailed statements, as their remarks will be found to form a link between the complex subject and the reading chemists. As a compact résumé of the higher problems of photography this volume should be of great service. It upholds worthily the traditions established by the Faraday Society. S. P. S.

PULVERISED AND COLLOIDAL FUEL. By J. T. DUNN. London: Ernest Benn, Ltd. Pp. 196. 25s.

The utilisation of fuel in powdered form is a question which is exciting considerable attention in this country at the present time. Although attempts were made in the early part of the last century to burn fuel in this form, it was not until its advantages were recognised by the cement industry that the process was tried on any large commercial scale. In America and on the Continent the use of powdered fuel has been greatly increased during the last decade, the method having been applied to a great variety of industrial purposes. In 1918 Mr. L. C. Harvey, after studying the subject for some time in all its bearings in the United States, produced a report on "Pulverised Fuel Systems in America," which was published by the Fuel Research Board, in order to furnish British industries with reliable data from which conclusions could be drawn as to the applicability of the process to individual conditions.

In the present work Dr. J. T. Dunn, the author, has presented, in a clear and concise manner, the general chemical principles underlying the combustion of fuel, while giving an unbiassed account of the advantages and disadvantages accompanying its use in powdered form. Much of the volume is devoted to descriptions of plant and engineering details, for which Dr. Dunn has drawn freely not only upon his own experiences in connection with powdered fuel plants, but on other published data, including the report already mentioned.

The book, while giving details of typical plants, maintains an admirable sense of proportion, and cannot in any sense be described as a mere catalogue of plant. Its publication undoubtedly fills the "long-felt want" beloved of the journalist, presenting as it does in a very readable form a reasoned account of a method of fuel burning which, after the passing of the present period of industrial depression, promises to play an important part in the utilisation to the full extent of our stores of coal. L.

QUANTITATIVE CHEMICAL ANALYSIS. By F. CLOWES and J. B. COLEMAN. London: J. and A. Churchill. Pp. 576. 18s.

Clowes and Coleman's "Quantitative Analysis" has now been for 30 years an established institution in the chemical departments of our Universities and elsewhere. In the 12th edition several useful additions to the 11th edition have been made which bring the methods given more into line with current practice. As examples might be mentioned the perchlorate method for the estimation of potassium, the dimethyl-glyoxime method for nickel, the Rosenhain modification of the William Thomson calorimeter, and the Gerber centrifugal method for the estimation of fat in milk. The sections on milk and butter analysis have been revised and enlarged, and a polarimetric method for sugar determination added.

The great value of the book lies in the simplicity combined with accuracy of the methods described, no method apparently being included until time and trial have established its right to a place. "Clowes and Coleman" is as safe as the Bank of England. It is also as conservative. The section on Organic Analysis has remained substantially unaltered since the early editions. This hardly takes sufficient account of the recent establishment of the dyestuff and fine chemical industries in this country. While the methods of determination of the elements in an organic compound are important and will always remain fundamental, their use is comparatively seldom necessary in the analyses required in these industries, and there are a number of simple well-established methods for the estimation of organic compounds, such as the nitrite and bromate methods for the estimation of amines and phenols, whose inclusion in this book would materially enhance its usefulness. A. D.

PRACTICAL PHYSICAL CHEMISTRY. By ALEXANDER FINDLAY. London: Longmans, Green and Co. Pp. 298. 7s. 6d.

This well known book has been thoroughly revised, and several welcome additions of new matter have been made. The additions include descriptions of the Cottrell ebullioscopic method, the Abbé refractometer, the Hilger wave-length spectrometer, of experiments on oxidation and reduction potentials, electrometric analysis, and colloid chemistry. The bibliographical references have been considerably extended, and the few errors occurring in the third edition, such as that in the wave-length of the red helium line, 7065A, have been corrected.

The choice of absolute potentials as the basis of the experiments on electromotive force is perhaps open to criticism on account of uncertainties in the measurements with the zero electrode. Many authors, including G. N. Lewis, prefer to refer all electrode potentials to the hydrogen electrode, and this plan has several advantages of a practical nature. A more serious matter is the confusion which is created by the use of two tables of electrode potentials.

The revised course of experiments covers all the ground necessary for the honours degree in Chemistry, and forms an excellent basis for specialised work in Physical Chemistry.

The author and publisher are to be congratulated on the low price of this text-book. Its popularity, which is evident by the number of editions and impressions already issued, will be enhanced by the changes which have been made. W. E. G.

Oil and Colour Chemists' Association

Demonstration of Recent Inventions

At the March monthly meeting of the Oil and Colour Chemists' Association, which was held at the Birkbeck Institute on Friday, March 20, there was an exhibition and demonstration of technical plant as applied to the oil and colour industry. There were three items, namely, the Lamplough Daylight Lamp, the Hele-Shaw Stream Line Filter, and a new Slide Rule by Mr. A. E. Bawtree. In the absence of the President, Mr. C. A. Klein (Brimsdown Lead Co., Ltd.) was in the chair.

The meeting coincided with the centenary celebrations of Birkbeck College, so that a background of a distinctly festive nature was provided. At intervals distant sounds of cheering, blowing of horns and sounding of other instruments arose from the distance, and at the close the Oil and Colour Chemists found their exit somewhat impeded, though not prevented, by crowds of enthusiastic students armed with confetti and coloured streamers waiting to do the traditional honours to the speaker of the evening, Mr. Stanley Baldwin. Upstairs in the chemical lecture room there was also an enthusiastic gathering, but one of scientific rather than festive kind. Mr. Lamplough, in demonstrating the Lamplough Daylight Lamp pointed out the great difficulties in matching fabrics and colours under even the most favourable conditions, and he showed some remarkable examples of tints obtained from mixed dyes, which matched in one light and appeared quite different in other lights. A very interesting point was the appearance of reddish or greenish spots on these fabrics owing to the different sensitiveness of the "yellow spot" in the retina of the eye.

Mr. Pickard in demonstrating the Stream Line Filter, invented by Dr. Hele-Shaw, roused considerable interest, and numerous questions were asked as to the suitability of the instrument for filtering oils and varnishes. An interesting development indicated is an arrangement by which the principle of edge filtration may be applied to ordinary types of filter presses.

The Lamplough Daylight Lamp

This "Lamplough" Daylight Lamp was described and demonstrated by Mr. Lamplough, who spoke of the difficulties that had been encountered from time to time in obtaining a satisfactory combination in order to obtain a really efficient daylight lamp for colour matching purposes. The particular lamp which he demonstrated had a double absorption screen, and the novel feature of it was the combination of a blue screen and a light pink screen. Some of the earlier types of daylight lamp used a blue screen only, but there were certain outstanding defects in the correction obtained with that glass particularly in the green region of the spectrum, and the pink screen achieved a further correction, and gave what Mr. Lamplough claimed to be a closer approach to daylight than has yet been achieved. This lamp had so far been supplied mainly in the dyeing industry, and Mr. Lamplough added that it would immensely simplify the problems of the dyer if natural daylight were not used at all, and if merchants could be induced to buy materials by means of a standard daylight lamp.

The Chairman commented upon the importance of colour matching in the paint industry,

Mr. G. G. Aston said it was wonderful how uniform matching could be in natural daylight providing there was sufficient of it. At present there were a large number of daylight lamps on the market, but he, personally, had found a great difficulty in correct matching with them. The chief difficulty was, it seemed, that the work was carried out too near the lamp so that the light falling on the colours to be matched was not sufficiently diffused.

Mr. T. M. Tyson, Mr. A. E. Bawtree, Mr. Noel Heaton, Mr. R. P. L. Britten, Mr. W. G. Dunster, and Mr. S. G. Clifford also spoke on the difficulties of matching colours with daylight lamps, particularly in cases where inks or white and difficult colours such as pale yellow were dealt with.

Mr. Lamplough, replying to points raised in the discussion, said it was possible to make a correction in his lamp to give sunlight. He thought the efficiency of his lamp was demonstrated by the fact that it had been sold mainly to dyers who were recognised as the most critical people to deal with. A point to be remembered was that things which were sensitive to changes in artificial light were also sensitive to changes in daylight. Some people were using his lamp in preference to daylight even when there was daylight available.

A demonstration was then given of the lamp.

The Stream Line Filter

Mr. Pickard, of the Stream Line Co., Ltd., then explained the principles of Dr. Hele-Shaw's filter. It has already been described in our columns, and certain modifications were indicated at the time of the joint discussion on water purification between the Chemical Engineering Group and the Institution of Mechanical Engineers (The Chemical Age, March 1, p. 216).

The Chairman, Mr. Noel Heaton, Mr. Hedley Barry, Mr. Harrison, Mr. W. G. Dunster, Mr. Townsend, Mr. Drummond, and Mr. T. M. Tyson asked various questions which were replied to by Mr. Pickard, who said that most of them were due to the fact that he had had to rush through his description of the filter. The use of the filter for obtaining solids instead of liquids had not at present been commercially developed but he saw means by which it could be done. Neither had he tried the filtration, of prussian blue but he would be extremely surprised if the filter failed in this because he had filtered gas-works sludge which passed through ordinary filter paper. The question as to the separation of chrome was answered by his reply in regard to prussian blue. The superiority of the stream line filter over other types was that it would deal with very much smaller particles, and the degree of filtration was altered by the degree of pressure on the pack of papers. With regard to linseed oil he was not aware of the effect of filtering upon the properties because so far the company had merely filtered linseed oil for customers and sent it back, but as the customers expressed themselves satisfied he could only assume that the oil had not been injured in any way. As to the speed of operation it was possible to work with a comparatively small pack of filter papers at the rate of about 100 gallons per hour, with a thin varnish, and 50 gallons per hour with more difficult varnishes without any heating and a pressure of about 25 lb. on the feed. With regard to changing over from one material to another, there was no difficulty as long as the remains of the previous material were washed out of the filter with some suitable solvent, or the first runs of the second material were rejected. In reply to the question as to how long it took to unload and recharge the filter, as an actual fact the filter was never unloaded. It was simply washed out and could continue in actual use anything from six months to a year. With regard to work upon high viscosity substances, such as thick syrups, at the moment he was a little bit doubtful as to the relation of viscosity to the capacity of the filter. The operation of the filter did not seem to depend so much upon the viscosity as on the specific gravity of what was being filtered. For instance, linseed oil and varnish would go through quite well, and yet gum, which most people would think much worse, would go through very much quicker still; on the other hand thick lubricating oil did not go through so rapidly, whilst varnishes were only a little slower than water. On the other hand petrol and benzol spirit would go through at the rate of 400 gallons per hour on the same size filter. He had accomplished the filtration of syrups but they went through very slowly. He could not say exactly what amount was lost in the filter papers, but it was not very much because the pack of paper lasted such a long time.

The Bawtree Slide Rule

Mr. A. E. Bawtree then explained and exhibited a new slide rule for the use in oil and colour works, his aim being to get simplicity of operation and durability to withstand the rough usage of the workshop laboratory. This slide rule consisted of a fixed centre disc and another moving around it. The whole was encased in a wooden frame, and Mr. Bawtree explained how it was possible to divide paints and varnishes into their percentage compositions and to compute prices, etc., with it. It had, he said, been tested in various departments and found to be a very great time saver, and was now on the market.

United Alkali Co.

Chairman's Review of a Successful Year

THE annual meeting of shareholders of the United Alkali Co., Ltd., was held on Wednesday, March 19, at Liverpool, Sir Max Muspratt, Bart. (chairman) presiding.

The Chairman, in proposing the adoption of the report and balance-sheet, stated that a year ago, when the balance-sheet for the two years 1921–22 was presented, he pointed out that the former year was exceptionally bad and the latter exceptionally good, expressing, at the same time, the opinion that the mean of the two years would probably represent the position for 1923. This forecast had practically been realised. After providing £15,000 for debenture redemption, and after payment of debenture interest, the profit was £63,000 in excess of the average of the two previous years. The net balance of profit was £337,000. No further ordinary capital had been issued during the year, and the £300,000 debenture stock lodged with the bankers had been returned. The balance of debts owing to the company, coupled with cash at bankers, as against debts owing by the company, disclosed a considerable improvement in the financial position of the company. Stocks showed a reduction of £17,000, and investments in subsidiary and other companies were £30,000 higher, the latter representing the acquisition of controlling interest in a well-developed quarry in North Wales for the provision of the company's large requirements of limestone.

The general reserve fund, to which £100,000 was added from the profits, now stood at £850,000, and was to be divided into a general reserve of £490,441 and a depreciation reserve of £359,558. The latter would be added to in future years according to amounts allowed in respect of wear and tear by the Revenue authorities. In August last interim dividends of 3½ per cent. upon the preference shares and 4 per cent. upon the ordinary shares were distributed. This, together with the transfer to reserve, absorbed £203,691, and, after the inclusion of £86,734 brought forward, a net surplus of £220,375 remained to be dealt with in conformity with the proposals set out in the report. The final dividends now recommended would make the dividends for the year 1923 7 per cent. on the preference shares and 10 per cent. on the ordinary shares, or at the same rate as for 1922, allowing for the increased ordinary share capital.

The chairman made a brief appropriate reference to the retirement of the chief accountant (Mr. Thomas Clarkson), who had occupied the position since the company was founded, and who, prior to that, had had many years' service with Messrs. Golding Davis, of Widnes, one of the original vendors to the United Alkali Co. Mr. Whinyates had been promoted to occupy the post.

Features of the Year

Generally speaking, the year had been one of steady progress, a feature of outstanding interest being the centenary of the inauguration in this country of the alkali industry. The effect of the celebration of this event, which aroused expressions of the greatest interest and good feeling towards the company in all quarters of the world, was to be followed by a striking display at the British Empire Exhibition, where, under the auspices of the Association of British Chemical Manufacturers, a survey of British chemistry from the simplest practical processes to the most advanced theoretical developments was being prepared, which was expected to be unique in the history of exhibitions.

The scheme of composite life assurance for the company's manual workers and lower-paid staff had now been in operation for a year. Not only had it proved of value to the dependents of workmen at the difficult period following the death of the breadwinner, but the institution of advisory works' committees had brought about additional benefits, not only in ensuring sympathetic treatment of beneficiaries, but in bringing the company's officials into very close personal touch with the workmen. For the recreation of employes at Widnes seventy acres of land had been purchased, and would be laid out for golf, football, cricket, tennis and bowls. Shareholders would heartily concur in this as tending to cement the cordial relations existing between the company and its men.

The rates of wages agreed between the company and the men's representatives in October, 1922, were still in operation. There was so much instability about the cost of living that the company had not asked for further reductions.

Two Notable Developments

"From time to time I have referred to our mines in Spain," the Chairman proceeded, "and especially to their great utility during the war. Much attention has been given to the close co-ordination of the mines and our consuming works, and the results of the policy initiated some years ago and the methods of dealing with our ores then adopted are now in full working order. These results entirely justify the policy of our board, and the company has now available very large quantities of pyrites at a cost much below the price at which the raw material for the production of sulphuric acid can be bought from any other source.

Extending the Range of Products

"In the production of organic chemicals we have continued to develop and extend our range of intermediate products. This has followed on the extensive research work which the company has carried out during many years. We have always maintained an efficient research organisation, and, with our large interest in the development of organic chemical business in this country, it has become necessary to increase our research facilities still further. Plans are now under consideration for this purpose.

"Your directors have watched with friendly interest and with some anxiety the progress of dyestuffs production in this country. They have always been desirous of co-operating with the dyemakers in their great efforts towards the success on a great scale of this industry, and they regret that co-operation has not so far in all cases been as complete as, in their opinion, should be possible to great mutual advantage. The possibilities in connection with our own business of this branch of chemical manufacture have the constant attention of the board.

"With regard to the year on which we have entered, the times are still unsettled. Political conditions in Europe, with their financial reactions, still retard the attainment of industrial stability in this country. The great consuming industries at home are still suffering serious depresssion, but there are some signs of increased activity. The constantly changing circumstances continue to demand the closest attention of your directors, and I trust that next year they will again be able to place a satisfactory report before you." (Applause.)

The Chairman, in addition to moving the adoption of the report and accounts, formally proposed the transfer of £15,000 to debenture resumption account and £100,000 to reserve, and that dividends of 3½ per cent. on the preference shares, making 7 per cent. for the year, and 6 per cent. on the ordinary shares, making 10 per cent. for the year, be paid, leaving £102,846 to be carried forward. (Applause.)

Modernisation of Methods

Dr. G. C. Clayton, C.B.E., M.P., in seconding, expressed sympathy with the chairman in the loss of his father, Dr. E. K. Muspratt, who was president of the company and a leading spirit in the heavy chemical industry for a great number of years. His knowledge of the industry was unrivalled, and they desired to acknowledge specially the debt they owed to him. (Hear, hear.) Shareholders had every reason to be proud of the company's present position. (Hear, hear.) During the last ten years, practically every process employed had been modernised and modified, all resulting in improved costs of production and improved conditions of working for the employees. On the occasion of the centenary celebration visits last year, those acquainted with the works in former times were astonished and delighted with the changes effected. The company were fortunate in having on their chemical and engineering technical staffs experts capable of carrying out these changes, and to them and to the other employees who had so splendidly adapted themselves to the new conditions their thanks were certainly due. Dr. Clayton informed the meeting of the wonderfully successful results achieved by their staff in recent efforts to protect cattle from infection by foot-and-mouth disease. The process consisted of scientific disinfection with chlorine disinfectants, based on their previous knowledge of their value in other cases. "Altogether," said Dr. Clayton, "some 500 farms holding about 20,000 head of cattle had been treated and in only two cases—and those

where the instructions were not followed—have outbreaks occurred. (Applause.) Bearing in mind that disinfection is only resorted to when the farms are in immediate proximity to an affected farm, I think we have every reason to be proud of the results achieved and to congratulate the members of our staff who so ably conducted this campaign." (Hear, hear.)

The motion was carried unanimously.

On the motion of Mr. A. E. Rayner, seconded by Mr. W. A. Short, Sir Max Muspratt, Bart., Sir Edward A. Brotherton, Bart, and Mr. James Tennant were unanimously elected directors.

The meeting concluded with an extremely cordial vote of thanks passed to the chairman on the motion of Sir Edward Brotherton, seconded by Mr. L. Cappel.

The Chairman, in acknowledgment, said he was delighted that they had been able to present such a very good balance-sheet, and that the shareholders were all amply satisfied with it.

Theobromine in Cacao Fermentation

Society of Chemical Industry: Birmingham Section

Two interesting papers (1) "The Fermentation of Cacao" and (2) "The Relation of Theobromine During the Fermentation of Cacao" were read before the members of the Birmingham and Midland Section of the Society of Chemical Industry at the Birmingham University on Tuesday, March 18, by Mr. A. W. Knapp (Chief Chemist, Messrs. Cadbury's, Bournville, Birmingham). Mr. R. V. Wadsworth was associated with him in the second contribution. Dr. E. B. Maxted presided.

Mr. Knapp outlined the harvesting methods and preparation of cacao seeds prior to fermentation, and mentioned that one of the effects of the latter was the liberation of theobromine, which gave cocoa its peculiar tonic and stimulating qualities. A fermented bean looked plumper than the unfermented bean; and the shell was more loose from the bean. The unfermented bean before roasting was "cheesy" to cut and there was a difference in colour; unfermented beans were dull, often slaty in colour; fermented beans were purplish or brown. To the taste the fermented bean was less astringent, and the aroma, on roasting, was like that of cocoa or chocolate.

Effect of Fermentation

Dealing with the question of the relation of the theobromine content of cacao to its fermentation, instead of an increase in theobromine in fermented cacao, the authors had invariably found in cacaos of the same kind that the fermented samples contained less theobromine than the unfermented. The bean became full of an acid liquid during fermentation and resulted in some of the theobromine going into solution. Actually, they found that the shell of the bean fresh from the pod contained only a fraction of a percentage of theobromine, and they suspected that any theobromine found therein came from the cotyledons so that the cacao nib naturally contained less theobromine after fermentation. It was evident the authors found that at some period greater than two and less than four days, the distribution of the theobromine took place. They would expect that to commence somewhere about the sixtieth hour, when the temperature had risen high enough to kill the bean and the acid liquid had commenced to diffuse freely through the cotyledons. The distribution of theobromine appeared to start at a fairly definite period, and an appreciable percentage of the theobromine appeared to go almost immediately into solution. The authors said they had reason to believe that the theobromine found in the shell after fermentation really existed as such.

A Loss of Theobromine

They attempted to balance the losses and gains of theobromine thus, after four days' fermentation: 85·2 parts of nib lost 0·43 per cent. theobromine=0·36; 14·8 parts of shell gained 2·07 per cent. theobromine=0·31. This was a fair agreement, but for longer periods the loss exceeded the gain appreciably.

The washing of the beans did not appear to affect appreciably the theobromine content of shell or nib. They were satisfied from an examination of the cacao beans of commerce that theobromine passed into the shell during fermentation.

Theobromine, free and combined, existed only in the cotyledons of the fresh cacao bean; the skin of the fresh bean was practically free from theobromine. As fermentation proceeded the temperature rose high enough to kill the bean, and at once the liquid which permeated the bean contained theobromine. Thus theobromine passed into the shell so that it was as usual in a well-fermented bean of the Forastero type to find from 0·8 to 2·98 per cent. of theobromine in the dry shell, practically all of which had come from the cotyledons. Hence the longer the fermentation the less theobromine would be found in "nibs."

The chairman asked if any experiments had been made as to the influence of a constant temperature upon the rate of fermentation. Had it been found possible to produce artificially the distinctive aroma of cocoa?

Mr. F. R. O'Shaughnessy inquired what were the results upon fermentation when the air was excluded or restricted.

Mr. Rendall suggested that theobromine might exist as tannate.

Mr. Knapp said he was not aware that a product at all comparable with the real article with respect to aroma had been produced artificially. No work had been done, so far as he knew, as to the influence of constant temperature upon fermentation. Adequate aeration was essential. He knew of nothing that contradicted the theory that theobromine might exist as tannate.

Jubilee of the Physical Society

A Distinguished Gathering

THE jubilee of the Physical Society was celebrated in London last week from Thursday to Saturday, March 20-22. On the first day there was an address by the President, Mr. F. E. Smith, followed by the presentation of foreign delegates, and a paper by M. le Duc de Broglie on "The Photo-Electric Effect in the Case of High-Frequency Radiation." The President, in the course of his address, said that when the Society was founded by Professor Guthrie practically the only large laboratory in existence was that at the Royal Institution. In the same year the Cambridge laboratory was established at Cambridge. When the Society was founded there were 99 members; now there were 600. In the evening Sir Richard Paget, by arrangement with the Institution of Electrical Engineers, gave a lecture on the Nature of Speech, in which he described and illustrated a number of experiments showing the means of producing or reproducing the human voice.

On Friday there were a number of reminiscences by members of long standing. The speakers included Professor Fleming, the discoverer of the wireless valve, who outlined the historical experiments through fifty years which led to the detection of electromagnetic waves, as predicted by Maxwell in 1866. Professor H. E. Armstrong referred to the work of the founder of the Society (Guthrie) in the interaction of ethylene and sulphur chloride, which acquired unenviable fame in the late war as mustard gas. Guthrie was in no way aware, he said, of the depths of iniquity of which he was unconsciously guilty. Sir Oliver Lodge spoke on "Our Present Position as Regards Ether," and said though there was a tendency to think that the theory of relativity had rendered the ether theory obsolete, regarded in a rational and physical manner, we must still regard the ether as existing, though our ideas of it were modified. We were trying to find the connection between matter, motion and the ether, particularly which kind of motion was associated with magnetic fields, electrostatic fields, and light radiation. Other discourses were given by Sir William Barrett, Sir Richard Glazebrook (on behalf of Professor C. Vernon Boys, who was unable to be present), Sir Arthur Schuster and Dr. C. Chree.

On Saturday there was a banquet for fellows and guests at the Connaught Rooms, at which the Duke of York, the Prime Minister and Lord Haldane were the principal guests. The Duke of York, in responding to the toast of "The Royal Family," emphasised the international character of the Society's work. The Premier, proposing the toast of "The Physical Society of London," referred to the glorious inspiration science was, not to the scientific man only, but to the man who intended to live a strenuous and useful life. He then drew a comparison of the scientist and politician, who experimented with a hypothesis, recorded results, charted, considered, and made definite in legislation, for the foundations of further hypothesis. Among other speakers were Lord Haldane, who proposed "Kindred Societies," Sir Richard Glazebrook, Sir Oliver Lodge, Sir Joseph Thomson, Mr. J. H. Jeans (of the Carnegie Institute, Washington) and Sir Ernest Rutherford.

Referee's Decision on "Rongalite"

To Remain in the List

THE following is the decision of the Official Referee (Mr. Cyril Atkinson, K.C.) on the complaint by the Colour Users' Association that "Rongalite" is improperly included in the Board of Trade's list of dutiable chemicals under the Safeguarding of Industries Act :—

"The question in this reference is whether sodium formaldehyde sulphoxylate and zinc formaldehyde sulphoxylate and the various forms in which they are marketed are properly included in the list published by the Board of Trade. It is unnecessary to decide whether they are fine chemicals or analytical reagents, as in my opinion they are properly included in the list as synthetic organic chemicals.

"It is scarcely contended that these substances are not organic, but it is strenuously urged that the definition of synthetic organic chemicals ought to be restricted to such organic compounds as are built up from their elements or from such other organic groups as can themselves be built up from their elements. It is sought to exclude from the conception of organic synthesis those syntheses in which an inorganic molecule is combined with an organic molecule.

"In the camphor case I refused to accept such a restricted view, and I am not prepared to do so now. I think that such combinations are organic syntheses provided that they result in the formation of a structure not previously present.

"I think that the complainants have probably proceeded with this complaint, relying on a recent article in the *Chemical and Industry Review* by Sir William Pope. They would have a strong case if that article expressed the whole view of Sir William Pope, but I am satisfied that it does not. I accept entirely his evidence as to that. Incidentally I may point out that the statement in the article that I decided that calcium carbide was not synthetic is wholly inaccurate. The question of synthesis was not dealt with at all in my award dealing with calcium carbide. Calcium carbide was not in the Board of Trade list, and I declined to order it to be inserted because I was satisfied that the Board was right in taking the view that calcium carbide was not so generally regarded as an organic chemical as to justify its inclusion."

The Affairs of Mr. A. E. Barton

Discharge Suspended for Two Years

AT the London Bankruptcy Court, on March 19, an application was made to Mr. Registrar Hope for the discharge of Alfred Ernest Barton, who was described as of 31-32, Grosvenor Place, W., and was the promoter of Cumberland Coal Power and Chemicals, Ltd., which was formed in February, 1919, with a nominal capital of £250,000, to acquire collieries in Cumberland and to develop the Claude synthetic ammonia process.

The Official Receiver said that according to the trustee in bankruptcy the ranking liabilities amounted to £33,600, while the debtor's estate had realised £41. The debtor was formerly engaged in prospecting and pegging claims in the Transvaal and in prospecting in Western Australia. He afterwards became interested in various copper and industrial ventures, with the result that in November, 1918, he had a clear profit of from £80,000 to £100,000. He subscribed and paid for in full, 43,100 £1 shares of the Cumberland Coal Power and Chemicals, Ltd., and also, owing to the Treasury restrictions upon the issue of capital by joint stock companies, subscribed for an additional 34,593 shares upon which he only paid 6d. a share, intending to sell them, as indeed he did to a small extent. He considered that the prospects of the company were so good that he induced his wife to invest £10,000 in shares as well. At the end of 1921 the company entered into a contract to buy from the Tyssee River Co., of Norway, its water power and large factories for £600,000 and paid a deposit of £200,000. But it made default on its note issue, and, in consequence, went into liquidation with the result that the whole of the deposit was lost. The liquidator called up the defendant's liability of over £33,000 on his partly paid shares, and eventually presented the petition on which the receiving order was made. The debtor attributed his insolvency to the failure of Cumberland Coal Power and Chemicals, Ltd. He admitted that when he applied for the second batch of shares he could not then or since have paid up in full without borrowing.

The Official Receiver submitted and reported that debtor's assets were not of a value equal to 10s. in the £, and that he had brought on his bankruptcy by rash and hazardous speculation.

His Honour decided to suspend the discharge for two years.

Application of Paints and Varnishes.

Difficulties in Obtaining a Perfect Coat.

UNDER the auspices of the Paint and Varnish Technological Classes at the Birmingham Municipal Technical School a public lecture on "The Use and Application of Paints and Varnishes" was given at the school on Friday, March 21, by Mr. A. Lloyd Matthison (Chairman of the Midland Varnish, Paint and Colour Manufacturers' Association, and Director of Messrs. A. Holden and Sons, Birmingham).

After referring to the demands now put on makers of air-drying varnishes and paint for a quick drying and durable material, Mr. Matthison dealt with the ways in which the best products could be spoiled by careless application to dirty surfaces, or by unsuitable thinning, etc. He then dealt with products to be dried by heat. Here there was a great variation. His firm made varnishes that had to be stoved and dried in some cases for only two minutes, while others required a period of two days; some received a drying temperature of 80° F., and yet others 500° with a large number of intermediate times and heats. The japanning stove was sometimes a handicap on good results, though there had been a great advance in modern times in the japanning or baking oven. In the case of what was called a tunnel stove the work was not stationary; it moved in at one end and came out at the other, travelling all the time. By this method the drying time was considerably reduced and other economies were effected. The heating agency in stoves to-day was by steam, gas, coke and electricity. There were even more causes for failure in the case of stoving finishes than in that of air drying, but only one of them might be due to the varnish. A dirty brush, dirty utensils, stoves, or shops; badly ventilated stoves, incorrect stoving, tampering with the varnish, the wrong undercoat, or the improper preparation, or condition, of the surface to be varnished were among a few of the causes. Stoving varnish or enamel needed a dry heat and the speedy evacuation of the volatile elements given off during the process of drying. There should be an inlet as well as an outlet vent so that the current of air may, by circulating, carry off more quickly the exhalations. The cleaning of metal objects before enamelling was most important. He made bold to assert in the presence of Dr. Newton Friend, who was an acknowledged authority on corrosion, that if a steel tube were chemically clean and free from rust and was immediately coated with a film of stoving black enamel and stoved correctly then as long as that coat of enamel remained unfractured rust should not arise on that steel tube.

The lecture concluded with an outline of the methods of applying paints by brush, dipping, flowing, spraying, etc., and a few words of encouragement to the technical students in what was one of the most important practical subjects in modern life. After a vote of thanks was passed the lecturer was congratulated by Dr. Newton Friend and others.

Headquarters for British Chemistry

MR. G. S. W. MARLOW, assistant secretary of the Institute of Chemistry, addressed a meeting of the Glasgow Section on Friday, March 21, on the proposed closer organisation of the various chemical societies, and indicated several directions in which valuable co-ordination had already taken place, particularly in the matters of library facilities and chemical publications. In order to achieve these aims a common headquarters was essential. He felt that any practicable scheme must be planned on such a scale that it would need to be run as a separate business organisation, and he foresaw Chemistry House as a headquarters for all British chemical activities, both professional and industrial.

The following new Associates were formally admitted :—Miss J. F. Armour, Mr. W. G. Bailey, N. Cheadle, A. W. Dykes, R. G. W. Eadie, G. S. Ferrier, J. D. Fulton, J. G. Gay, H. Gibb, H. A. Macleod, A. M'Donald, T. C. Mitchell, H. C. Moir, A. F. Murray, Miss M. A. Murray, G. R. Lochhead, W. Roy.

Chemical Matters in Parliament

Coking and By-Product Profits

Mr. Shinwell, Secretary for Mines (House of Commons, March 19), replying to Mr. G. Hall, who asked for information regarding the profits made by the colliery owners in Great Britain for the past ten years, by coking, by-product, and other ancillary operations, giving each year separately, said that the information required was not in the possession of his Department.

Prices of German Dyestuffs

Mr. Waddington (House of Commons, March 20) asked whether the Chancellor of the Exchequer was aware that the price of German dyestuffs to the British purchaser had not been reduced by the reduction of 21 per cent. in the reparation duty; and whether, as the whole of the reduction in the duty was being retained by the Germans without any advantage to the British trader, he would consider the reimposition of the duty at 26 per cent.

Mr. Webb (speaking for the Chancellor) submitted the following reply:—I am aware that the price of German dyestuffs has not been reduced, but I am informed that practically the whole of the German dyestuffs imported into this country during the last few months have been against contracts made with the German suppliers prior to November 17, last, and in respect of which the German Government undertook to continue to refund the amount of reparation levy, provided that delivery were made before the end of March, 1924. The price of deliveries made after that date would have been subject to an increase corresponding to the amount of the levy. The present position is, therefore, that the British importer now pays 95 per cent. of the purchase price of any dyes imported to the German exporter, and 5 per cent. to the Customs, instead of 74 per cent. to the exporter and 26 per cent. to the Customs, as was formerly the case. Consequently, no reduction in prices is to be expected as a result of the alteration in the amount of the levy. The answer to the last part of the question is in the negative.

Industrial Alcohol: Alcohol Rebate.

Mr. Lorimer (House of Commons, March 20) asked the Chancellor of the Exchequer if he would grant a rebate on alcohol used in the manufacture of perfumery and toilet preparations equal to that which is to-day conceded to the manufacture of drugs; and whether he would revert to the practice in operation from 1902 to 1915, when spirit used by druggists and manufacturers of perfumes and toilet preparations was levied at the same rate—namely, 14s. 9d. per proof gallon, whereas the latter is now charged 74s. per proof gallon while the druggist is charged at the same rate as in 1902.

Mr. Snowden: As regards the first question, I am unable to anticipate the Budget statement. As regards the second, I would point out that the hon. member is under a misapprehension in stating that spirits used in the manufacture of medicines are dutied at the present time at the same rate as in 1902. The duty of 14s. 9d. per gallon now applicable to spirits used in medical preparations operated from 1910, and that increase in duty was applied to spirits of all kinds.

Mr. Lorimer: Why was any differentiation made?

Mr. Snowden: There are very strong reasons for it of an administrative character. It is, I understand, much easier to evade the revenue when spirits are used for perfumery purposes than for medicinal purposes.

Formaldehyde as Meat Preservative

Mr. Wheatley, Minister of Health (House of Commons, March 24), replying to Sir V. Bowater on a question regarding experiments, at present being carried out, in the preservation of meat by the use of formaldehyde, referred him to the answer given by Mr. Greenwood to Viscount Curzon, on March 3 on the same subject, in which it was stated that a shipment of chilled beef was being sent from New Zealand in the s.s. *Kent*, for examination by the Departmental Committee now sitting. He also said that although the use of formaldehyde as a preservative or colouring matter was prohibited, much depended on the method of application whether or not the meat would be fit for human food, and that if the meat was found to be unfit for this purpose, steps would be taken to prevent it being placed on the market.

Potato Spirit

Mr. Hardie (House of Commons, March 25) asked the President of the Board of Trade whether, in view of the large number of tons of potatoes of last year's crop ploughed into the ground because there was no demand for them, he would have prepared at Gretna Works plant to make from such supplies of potatoes the potato spirit for industrial purposes.

Mr. Webb said that, apart from other considerations, an industry could not be successfully established if it had to rely upon an occasional surplus of foodstuff for its raw material.

The Dyestuffs Agreement

The President of the Board of Trade (House of Commons, March 25), replying to questions by Mr. Graham White and Mr. Barclay, on the proposed arrangement between the British Dyestuffs Corporation and the I.G., said that he was unable to add anything to answers previously given.

Mr. Barclay asked whether Mr. Webb was aware that the answer he gave before was simply to the effect that he would consider the question and make a statement; and did he know that there was a good deal of uneasiness and a desire that no arrangement should be concluded before the matter had been raised in the House.

Mr. Webb: I am afraid that I am not in a position to make a statement on this subject. No arrangement has yet been concluded, negotiations are going on, and, as soon as I am in a position to make a statement, I shall certainly do so.

Mr. White: Can the right hon. gentleman give the House an assurance, in view of the great importance of this matter, that no decision will be arrived at before an opportunity is given to this House for a discussion upon this subject?

Mr. Webb: I do not think that the hon. Member need fear anything of that sort, but obviously I am unable to give any assurance now.

New Appointment for Dr. Masson

Dr. IRVINE MASSON, Reader in Inorganic Chemistry, University College, London, has been appointed Professor of Chemistry and Director of the Science Department in the Durham Colleges. Dr. Masson has done research work in Melbourne, Edinburgh, and London Universities, and worked during the war in the Research Department at Woolwich. He has published many articles in various scientific journals. He is one of the secretaries of the Chemical Society and a Fellow of the Institute of Chemistry.

Chemical Trade Wages

THE TRADE UNIONS are applying for wage increases of 1½d. per hour to shift process workers, 1d. an hour to time workers, and 10 per cent. to piece workers, with double pay for overtime work at week-ends. The application is to be considered at a meeting of the National Chemical Trade Joint Industrial Council on April 4.

Canadian Natural Alkali

CERTAIN changes have recently been introduced in Canada concerning the regulations affecting the royalties to be paid for the removal of natural alkali. Formerly under the Alkali Mining Regulations, which govern the disposal of natural accumulations of soluble mineral salts, a royalty was fixed at the rate of 12½ cents a ton on shipping weight, as determined from transportation returns at first point of shipment, which royalty, however, should not be less than 12½ per cent. of the selling value of the salts or brine in their natural state, but not refined. This selling value has now been fixed at two dollars a ton, so that the maximum royalty which may be collected shall not, in any case, exceed twenty-five cents a ton of two thousand pounds.

Scientific Instruments at Wembley

IT is not only in the Chemical Hall at Wembley that matters of scientific interest are to be found. CO_2 recorders, electrical recording thermometers, gas meters, pyrometers, and other scientific instruments will be shown by the Cambridge and Paul Instrument Co., Ltd., on their own stand in the Palace of Engineering, and on other stands in connection with plant shown by various exhibitors in both the Palace of Engineering and the Palace of Industry, and also in some of the Dominion pavilions. In the power station, which is to be open to inspection all the time, the boiler-house, engine-room and sub-station are all fitted up with electric recording instruments.

Referee's Decision on "Rongalite"

To Remain in the List

THE following is the decision of the Official Referee (Mr. Cyril Atkinson, K.C.) on the complaint by the Colour Users' Association that "Rongalite" is improperly included in the Board of Trade's list of dutiable chemicals under the Safeguarding of Industries Act :—

"The question in this reference is whether sodium formaldehyde sulphoxylate and zinc formaldehyde sulphoxylate and the various forms in which they are marketed are properly included in the list published by the Board of Trade. It is unnecessary to decide whether they are fine chemicals or analytical reagents, as in my opinion they are properly included in the list as synthetic organic chemicals.

"It is scarcely contended that these substances are not organic, but it is strenuously urged that the definition of synthetic organic chemicals ought to be restricted to such organic compounds as are built up from their elements or from such other organic groups as can themselves be built up from their elements. It is sought to exclude from the conception of organic synthesis those syntheses in which an inorganic molecule is combined with an organic molecule.

"In the camphor case I refused to accept such a restricted view, and I am not prepared to do so now. I think that such combinations are organic syntheses provided that they result in the formation of a structure not previously present.

"I think that the complainants have probably proceeded with this complaint, relying on a recent article in the *Chemical and Industry Review* by Sir William Pope. They would have a strong case if that article expressed the whole view of Sir William Pope, but I am satisfied that it does not. I accept entirely his evidence as to that. Incidentally I may point out that the statement in the article that I decided that calcium carbide was not synthetic is wholly inaccurate. The question of synthesis was not dealt with at all in my award dealing with calcium carbide. Calcium carbide was not in the Board of Trade list, and I declined to order it to be inserted because I was satisfied that the Board was right in taking the view that calcium carbide was not so generally regarded as an organic chemical as to justify its inclusion."

The Affairs of Mr. A. E. Barton

Discharge Suspended for Two Years

AT the London Bankruptcy Court, on March 19, an application was made to Mr. Registrar Hope for the discharge of Alfred Ernest Barton, who was described as of 31-32, Grosvenor Place, W., and was the promoter of Cumberland Coal Power and Chemicals, Ltd., which was formed in February, 1919, with a nominal capital of £250,000, to acquire collieries in Cumberland and to develop the Claude synthetic ammonia process.

The Official Receiver said that according to the trustee in bankruptcy the ranking liabilities amounted to £33,600, while the debtor's estate had realised £41. The debtor was formerly engaged in prospecting and pegging claims in the Transvaal and in prospecting in Western Australia. He afterwards became interested in various copper and industrial ventures, with the result that in November, 1918, he had a clear profit of from £80,000 to £100,000. He subscribed and paid for in full, 43,100 £1 shares of the Cumberland Coal Power and Chemicals, Ltd., and also, owing to the Treasury restrictions upon the issue of capital by joint stock companies, subscribed for an additional 34,593 shares upon which he only paid 6d. a share, intending to sell them, as indeed he did to a small extent. He considered that the prospects of the company were so good that he induced his wife to invest £10,000 in shares as well. At the end of 1921 the company entered into a contract to buy from the Tyssee River Co., of Norway, its water power and large factories for £600,000 and paid a deposit of £200,000. But it made default on its note issue, and, in consequence, went into liquidation with the result that the whole of the deposit was lost. The liquidator called up the defendant's liability of over £33,000 on his partly paid shares, and eventually presented the petition on which the receiving order was made. The debtor attributed his insolvency to the failure of Cumberland Coal Power and Chemicals, Ltd. He admitted that when he applied for the second batch of shares he could not then or since have paid up in full without borrowing.

The Official Receiver submitted and reported that debtor's assets were not of a value equal to 10s. in the £, and that he had brought on his bankruptcy by rash and hazardous speculation.

His Honour decided to suspend the discharge for two years.

Application of Paints and Varnishes.

Difficulties in Obtaining a Perfect Coat.

UNDER the auspices of the Paint and Varnish Technological Classes at the Birmingham Municipal Technical School a public lecture on "The Use and Application of Paints and Varnishes" was given at the school on Friday, March 21, by Mr. A. Lloyd Matthison (Chairman of the Midland Varnish, Paint and Colour Manufacturers' Association, and Director of Messrs. A. Holden and Sons, Birmingham).

After referring to the demands now put on makers of air-drying varnishes and paint for a quick drying and durable material, Mr. Matthison dealt with the ways in which the best products could be spoiled by careless application to dirty surfaces, or by unsuitable thinning, etc. He then dealt with products to be dried by heat. Here there was a great variation. His firm made varnishes that had to be stoved and dried in some cases for only two minutes, while others required a period of two days; some received a drying temperature of 80° F., and yet others 500° with a large number of intermediate times and heats. The japanning stove was sometimes a handicap on good results, though there had been a great advance in modern times in the japanning or baking oven. In the case of what was called a tunnel stove the work was not stationary; it moved in at one end and came out at the other, travelling all the time. By this method the drying time was considerably reduced and other economies were effected. The heating agency in stoves to-day was by steam, gas, coke and electricity. There were even more causes for failure in the case of stoving finishes than in that of air drying, but only one of them might be due to the varnish. A dirty brush, dirty utensils, stoves, or shops; badly ventilated stoves, incorrect stoving, tampering with the varnish, the wrong undercoat, or the improper preparation, or condition, of the surface to be varnished were among a few of the causes. Stoving varnish or enamel needed a dry heat and the speedy evacuation of the volatile elements given off during the process of drying. There should be an inlet as well as an outlet vent so that the current of air may, by circulating, carry off more quickly the exhalations. The cleaning of metal objects before enamelling was most important. He made bold to assert in the presence of Dr. Newton Friend, who was an acknowledged authority on corrosion, that if a steel tube were chemically clean and free from rust and was immediately coated with a film of stoving black enamel and stoved correctly then as long as that coat of enamel remained unfractured rust should not arise on that steel tube.

The lecture concluded with an outline of the methods of applying paints by brush, dipping, flowing, spraying, etc., and a few words of encouragement to the technical students in what was one of the most important practical subjects in modern life. After a vote of thanks was passed the lecturer was congratulated by Dr. Newton Friend and others.

Headquarters for British Chemistry

MR. G. S. W. MARLOW, assistant secretary of the Institute of Chemistry, addressed a meeting of the Glasgow Section on Friday, March 21, on the proposed closer organisation of the various chemical societies, and indicated several directions in which valuable co-ordination had already taken place, particularly in the matters of library facilities and chemical publications. In order to achieve these aims a common headquarters was essential. He felt that any practicable scheme must be planned on such a scale that it would need to be run as a separate business organisation, and he foresaw Chemistry House as a headquarters for all British chemical activities, both professional and industrial.

The following new Associates were formally admitted :—Miss J. F. Armour, Mr. W. G. Bailey, N. Cheadle, A. W. Dykes, R. G. W. Eadie, G. S. Ferrier, J. D. Fulton, J. G. Gay, H. Gibb, H. A. Macleod, A. M'Donald, T. C. Mitchell, H. C. Moir, A. F. Murray, Miss M. A. Murray, G. R. Lochhead, W. Roy.

Chemical Matters in Parliament

Coking and By-Product Profits

Mr. Shinwell, Secretary for Mines (House of Commons, March 19), replying to Mr. G. Hall, who asked for information regarding the profits made by the colliery owners in Great Britain for the past ten years, by coking, by-product, and other ancillary operations, giving each year separately, said that the information required was not in the possession of his Department.

Prices of German Dyestuffs

Mr. Waddington (House of Commons, March 20) asked whether the Chancellor of the Exchequer was aware that the price of German dyestuffs to the British purchaser had not been reduced by the reduction of 21 per cent. in the reparation duty; and whether, as the whole of the reduction in the duty was being retained by the Germans without any advantage to the British trader, he would consider the reimposition of the duty at 26 per cent.

Mr. Webb (speaking for the Chancellor) submitted the following reply:—I am aware that the price of German dyestuffs has not been reduced, but I am informed that practically the whole of the German dyestuffs imported into this country during the last few months have been against contracts made with the German suppliers prior to November 17, last, and in respect of which the German Government undertook to continue to refund the amount of reparation levy, provided that delivery were made before the end of March, 1924. The price of deliveries made after that date would have been subject to an increase corresponding to the amount of the levy. The present position is, therefore, that the British importer now pays 95 per cent. of the purchase price of any dyes imported to the German exporter, and 5 per cent. to the Customs, instead of 74 per cent. to the exporter and 26 per cent. to the Customs, as was formerly the case. Consequently, no reduction in prices is to be expected as a result of the alteration in the amount of the levy. The answer to the last part of the question is in the negative.

Industrial Alcohol: Alcohol Rebate.

Mr. Lorimer (House of Commons, March 20) asked the Chancellor of the Exchequer if he would grant a rebate on alcohol used in the manufacture of perfumery and toilet preparations equal to that which is to-day conceded to the manufacture of drugs; and whether he would revert to the practice in operation from 1902 to 1915, when spirit used by druggists and manufacturers of perfumes and toilet preparations was levied at the same rate—namely, 14s. 9d. per proof gallon, whereas the latter is now charged 74s. per proof gallon while the druggist is charged at the same rate as in 1902.

Mr. Snowden: As regards the first question, I am unable to anticipate the Budget statement. As regards the second, I would point out that the hon. member is under a misapprehension in stating that spirits used in the manufacture of medicines are dutied at the present time at the same rate as in 1902. The duty of 14s. 9d. per gallon now applicable to spirits used in medical preparations operated from 1910, and that increase in duty was applied to spirits of all kinds.

Mr. Lorimer: Why was any differentiation made?

Mr. Snowden: There are very strong reasons for it of an administrative character. It is, I understand, much easier to evade the revenue when spirits are used for perfumery purposes than for medicinal purposes.

Formaldehyde as Meat Preservative

Mr. Wheatley, Minister of Health (House of Commons, March 24), replying to Sir V. Bowater on a question regarding experiments, at present being carried out, in the preservation of meat by the use of formaldehyde, referred him to the answer given by Mr. Greenwood to Viscount Curzon, on March 3 on the same subject, in which it was stated that a shipment of chilled beef was being sent from New Zealand in the s.s. *Kent*, for examination by the Departmental Committee now sitting. He also said that although the use of formaldehyde as a preservative or colouring matter was prohibited, much depended on the method of application whether or not the meat would be fit for human food, and that if the meat was found to be unfit for this purpose, steps would be taken to prevent it being placed on the market.

Potato Spirit

Mr. Hardie (House of Commons, March 25) asked the President of the Board of Trade whether, in view of the large number of tons of potatoes of last year's crop ploughed into the ground because there was no demand for them, he would have prepared at Gretna Works plant to make from such supplies of potatoes the potato spirit for industrial purposes.

Mr. Webb said that, apart from other considerations, an industry could not be successfully established if it had to rely upon an occasional surplus of foodstuff for its raw material.

The Dyestuffs Agreement

The President of the Board of Trade (House of Commons, March 25), replying to questions by Mr. Graham White and Mr. Barclay, on the proposed arrangement between the British Dyestuffs Corporation and the I.G., said that he was unable to add anything to answers previously given.

Mr. Barclay asked whether Mr. Webb was aware that the answer he gave before was simply to the effect that he would consider the question and make a statement; and did he know that there was a good deal of uneasiness and a desire that no arrangement should be concluded before the matter had been raised in the House.

Mr. Webb: I am afraid that I am not in a position to make a statement on this subject. No arrangement has yet been concluded, negotiations are going on, and, as soon as I am in a position to make a statement, I shall certainly do so.

Mr. White: Can the right hon. gentleman give the House an assurance, in view of the great importance of this matter, that no decision will be arrived at before an opportunity is given to this House for a discussion upon this subject?

Mr. Webb: I do not think that the hon. Member need fear anything of that sort, but obviously I am unable to give any assurance now.

New Appointment for Dr. Masson

Dr. IRVINE MASSON, Reader in Inorganic Chemistry, University College, London, has been appointed Professor of Chemistry and Director of the Science Department in the Durham Colleges. Dr. Masson has done research work in Melbourne, Edinburgh, and London Universities, and worked during the war in the Research Department at Woolwich. He has published many articles in various scientific journals. He is one of the secretaries of the Chemical Society and a Fellow of the Institute of Chemistry.

Chemical Trade Wages

THE TRADE UNIONS are applying for wage increases of 1½d. per hour to shift process workers, 1d. an hour to time workers, and 10 per cent. to piece workers, with double pay for overtime work at week-ends. The application is to be considered at a meeting of the National Chemical Trade Joint Industrial Council on April 4.

Canadian Natural Alkali

CERTAIN changes have recently been introduced in Canada concerning the regulations affecting the royalties to be paid for the removal of natural alkali. Formerly under the Alkali Mining Regulations, which govern the disposal of natural accumulations of soluble mineral salts, a royalty was fixed at the rate of 12½ cents a ton on shipping weight, as determined from transportation returns at first point of shipment, which royalty, however, should not be less than 12½ per cent. of the selling value of the salts or brine in their natural state, but not refined. This selling value has now been fixed at two dollars a ton, so that the maximum royalty which may be collected shall not, in any case, exceed twenty-five cents a ton of two thousand pounds.

Scientific Instruments at Wembley

IT is not only in the Chemical Hall at Wembley that matters of scientific interest are to be found. CO_2 recorders; electrical recording thermometers, gas meters, pyrometers, and other scientific instruments will be shown by the Cambridge and Paul Instrument Co., Ltd., on their own stand in the Palace of Engineering, and on other stands in connection with plant shown by various exhibitors in both the Palace of Engineering and the Palace of Industry, and also in some of the Dominion pavilions. In the power station, which is to be open to inspection all the time, the boiler-house, engine-room and sub-station are all fitted up with electric recording instruments.

From Week to Week

IT IS EXPECTED that Professor Niels Bohr will visit Manchester in May in order to receive the honorary degree of D.Sc. from the University which was authorised last year.

AT A MEETING of the Birmingham and Midland Institute Scientific Society, on Wednesday, March 9, Mr. C. A. Vincent-Davies read a paper on the "Habits of Crystals."

THE CENTRAL IMPORTING AGENCY, of 46, St. Mary Axe, London, E.C.3, announce that they are in a position to offer new stocks of German "aniline dyes of every description."

MR. J. E. ANDREWS, who has been assistant manager of the Plymouth branch of the British Petroleum Company for several years, has been promoted acting manager of the London branch.

MR. JOHN ALEXANDER BLIGH, engineer and assistant manager of the United Alkali Co., Widnes, was on Saturday, March 22, nominated as a candidate for the Whiston Rural District Council.

AN EXPLOSION AND FIRE occurred on Wednesday, March 19, on the top floor of Robinson and Co.'s oil cake mills, Bristol. A quantity of meal became ignited and extensive damage was done to the premises and machinery.

PROFESSOR G. T. MORGAN was elected chairman of the Birmingham and Midland Section of the Society of Chemical Industry at the annual meeting on Wednesday, March 19. Dr. E. F. Twiss was added to the vice-chairmen.

THE DEATH OCCURRED on Saturday, March 22, at 22, Lockyer Road, Plymouth, of Mr. George Breeze. Mr. Breeze, who was 86 years of age, was chairman of directors in the firm of Breezes, Ltd., wholesale druggists, Plymouth.

THE SALTNEY CHEMICAL WORKS (late Government Stores), Chester, were put up for auction at the Law Association Rooms, Liverpool, on Wednesday, March 19, by Messrs. Ellis and Sons. Bidding started at £3,000, and the property was ultimately sold for £7,250.

IN THE COMPANIES' WINDING-UP COURT, on Wednesday, Mr. Justice Eve, on the petition of the Bournemouth Gas and Water Co., made an order for the winding-up of Devon and Cornwall Paint Co., Ltd. Counsel said the debt was £590. The petition was not opposed.

THE DEATH OCCURRED on Wednesday March 19, at his residence, 18, Addison Road, Kensington, of Dr. W. H. Maw, editor of *Engineering* from its foundation 58 years ago until the time of his death. Dr. Maw, who was interested in several engineering institutions, was 85 years of age.

DR. CHARLES A. KRAUS, professor of chemistry in Brown University, has been presented with the Nichols Medal awarded annually by the New York Section of the American Chemical Society "for the research published during the current year which in the opinion of the jury is most original and stimulative to further research."

A FIRE OCCURRED on Friday, March 21, at the works of Benzol and By-Products, Ltd., Crigglestone, near Wakefield. A tank containing about ten tons of pitch was ignited and some anxiety was felt owing to its proximity to the naphthalene plant. Fortunately the flames were soon mastered and the damage done was only trifling.

A LARGE WASHERY of the latest design is being erected at West Wylam Colliery by the Coppee Company, of London, for the Mickley Coal Co., Ltd. The plant, it is stated, will be capable of washing 1,000 tons of coal per day and dividing the coal into nuts, beans and peas for land sale use, the small coal being used for the coke ovens for by-product purposes.

A NEW BENZOL PLANT at the Ebbw Vale Works was destroyed by fire on Thursday, March 20. A spark from a passing engine is said to have ignited 20 tons of naphtha stored close by for loading, and it was feared that tanks containing 100,000 gallons of benzol would explode, but the work of three brigades prevented this. The damage is estimated at thousands of pounds.

IN THE BOW COUNTY COURT, on Monday, before Judge Snagge, John Miller, of 185, Turner's Road, a hackney carriage driver, sued A. Boake, Roberts and Co., of 100, Carpenter's Road, Stratford, manufacturing chemists, to recover £50 damages for personal injuries received by being knocked down by the defendants' motor car. The jury returned a verdict for the defendants, and judgment was entered accordingly, with costs.

THE DEATH has occurred of Mr. George Hughes, F.C.S., consulting chemist to the Agricultural Society of Barbadoes, at Birling House, Bearsted, near Maidstone, where he had resided for some time past. Mr. Hughes, who was approaching seventy years of age, was the inventor, patentee and proprietor of "Molascuit," a popular feed for horses, cattle, sheep, pigs and poultry.

A MEETING of chemical and dyestuffs traders, presided over by Mr. Thomas Henderson, was held on Thursday, March 20, in the Glasgow Chamber of Commerce. Mr. O. F. C. Bromfield, secretary of the British Chemical and Dyestuff Traders' Association, explained the policy and constitution of the Association, and pointed out the advantages which such an association conferred on its members. After discussion it was agreed to recommend that a branch of the association be formed in Glasgow.

A MEETING of the Chemical Engineering Group and the Birmingham Section of the Society of Chemical Industry is to be held in the White Horse Hotel, Congreve Street, Birmingham, on Friday, April 4, at 6.30 p.m., when a paper on "The Premier and Other Colloid Mills and their Applications in Industry" will be read by Capt. F. J. China. The chair will be taken by Dr. Maxted, the president of the Birmingham Section. Following the meeting an informal supper will be held in the same hotel.

IN A LECTURE before the Wadhurst and District Farmers' Club on Tuesday, March 25, by Mr. G. A. Cowie, M.A., B.Sc., F.I.C., an interesting and striking film was shown dealing with the use of finely ground kainit for killing charlock. The film shows not only the conditions under which the treatment should be given to achieve success, but also the different stages in the killing process. The film, which has a high educational value in so far as it demonstrates the structure and internal movements of living plant cells, is to be shown in the next few weeks before various county branches of the National Farmers' Union. Other clubs and societies who would like to see the film are invited to correspond with Mr. Cowie, at 39, Victoria Street, Westminster, S.W.1, who will be pleased to arrange for a free demonstration.

THE ANNUAL GENERAL MEETING of the Birmingham and Midland Section of the Society of Chemical Industry was held at the Birmingham University on March 18, Dr. E. B. Maxted presiding. Mr. Geo. King (Hon. Sec.) announced that the following had been elected the officers for the ensuing year:—Chairman, Professor G. T. Morgan, D.Sc., F.R.S. (head of the Chemistry Department, University of Birmingham); Vice-Chairmen, Mr. F. R. O. Shaughnessy (consulting chemist, Birmingham Tame and Rea District Drainage Board) and Dr. T. W. Twiss (chief chemist, Dunlop Tyre Co.); Hon. Secretary and Treasurer, Mr. Geo. King (Albright and Wilson, Oldbury). The new Committee is constituted as follows:—Mr. G. H. Blenkarn, Mr. S. A. Brazier, Mr. W. A. S. Calder, Mr. W. T. Collis, Mr. W. C. Davis, Mr. A. E. Johnson, Mr. A. W. Knapp, Dr. A. Parker, Dr. E. B. Maxted, Mr. C. Watson, Dr. W. Wardlaw, Mr. C. E. Wood, Dr. T. J. Murray, Mr. J. C. Mann, and Mr. L. M. Jones. The meeting approved the election of about a dozen associate members.

Coking and By-Product Practice in India

THE qualifications expected of a coke oven manager in India were described to a meeting of the Coke Oven Managers' Association (Midland Section) at Leeds University on Saturday, March 22. Mr. J. Parker, of Messrs. W. C. Holmes and Co., Ltd., Huddersfield, who read a paper on "Modern Coking and By-Product Practice in India," said the plant which was formerly under his care at Loyabad differed very little from the ones at home. But a manager in India was expected to be a first-class mechanical, electrical, and civil engineer, and a first-class chemist and fuel technologist. He must possess a wide knowledge of men and affairs, with a gift for organisation. Finally, he was expected to have the wisdom of Solomon to enable him to settle satisfactorily the many and varied disputes which naturally arose in a large community having mixed religions and moral habits.

References to Current Literature

British

EVAPORATION.—Evaporating and drying plant. Part I. S. G. Ure. *J.S.C.I.*, March 21, 1924, pp. 294–303.

The evaporation rate of some solutions. L. S. Bagster. *J.S.C.I.*, March 21, 1924, pp. 61–65 T.

INDIGO.—Some pages from the story of indigo. Part II. The decline of the natural indigo industry. W. A. Davis. *J.S.C.I.*, March 21, 1924, pp. 303–307.

ACIDS.—The vapour pressures of fuming sulphuric acid, and their application to the problem of the absorption of sulphur trioxide. J. W. McDavid. *J.S.C.I.*, March 21, 1924, pp. 57–61 T.

The dissociation constants of phosphoric acid. E. B. R. Prideaux and A. T. Ward. *Chem. Soc. Trans.*, February 1924, pp. 423–426.

Calculations on the neutralisation of mixtures of acids, and a universal buffer mixture. E. B. R. Prideaux and A. T. Ward. *Chem. Soc. Trans.*, February, 1924, pp. 426–429.

ANALYSIS.—The estimation of lead in potable waters, and in urine. J. C. Thresh. *Analyst*, March, 1924, pp. 124–128.

The colorimetric estimation of lead in cream of tartar. R. L. Andrew. *Analyst*, March, 1924, pp. 129–130.

Notes on the estimation of chromium. H. T. S. Britton. *Analyst*, March, 1924, pp. 130–133.

DYEING.—The dyeing of cellulose acetate silk. L. G. Lawrie. *J. Soc. Dyers and Col.*, March, 1924, pp. 69–74.

Colour solvents and their application to textile fibres. A. E. Woodhead. *J. Soc. Dyers and Col.*, March, 1924, pp. 74–77.

The relation between the nitrogen of wool and its affinity for acid and basic dyes. E. R. Trotman. *J. Soc. Dyers and Col.*, March, 1924, pp. 77–79.

VALENCY.—The electronic theory of valency. B. Flürscheim. *Phil. Mag.*, March, 1924, pp. 569–576.

ATOMS.—Experiments on the artificial disintegration of atoms. G. Kirsch and H. Pettersson. *Phil. Mag.*, March, 1924, pp. 500–512.

United States

COKE.—How structure and surface affect combustibility of coke. A. Thau. *Chem. Met. Eng.*, March 3, 1924, pp. 347–350.

FILTRATION.—Cost of filtration equipment and operation. An analysis and comparison of the factors that determine cost of installation and operation of the three principal types of filters. W. G. Whitman and T. Fuwa. *Chem. Met. Eng.*, March 3, 1924, pp. 355–359.

The filtration of activated sludge. F. W. Mohlman. *J. Ind. Eng. Chem.*, March, 1924, pp. 225–227.

TANNING.—Latin America's greatest contribution to the tanning industry. Quebracho. O. Wilson. *Chem. Met. Eng.*, March 3, 1924, pp. 344–346.

Acidity of vegetable tan liquors. E. J. Kern and J. W. Kolnig. *J. Ind. Eng. Chem.*, March, 1924, p. 261.

PHOSPHATES.—The preparation and chemical nature of calcined phosphate. E. W. Guernsey and J. Y. Yee. *J. Ind. Eng. Chem.*, March, 1924, pp. 228–232.

WATERS.—Soluble aluminium and the haematoxylin test in filtered waters. W. D. Hatfield. *J. Ind. Eng. Chem.* March, 1924, pp. 233–234.

FOODSTUFFS.—A chemical study of canned salmon. Part I. Variations in composition of the Pacific Coast salmons and steelhead trout as influenced by species and locality where caught. O. E. Shostrom, R. W. Clough and E. D. Clark. *J. Ind. Eng. Chem.*, March, 1924, pp. 283–289.

The nature of corrosion in canned fruits. E. F. Kohman and N. H. Sanborn. *J. Ind. Eng. Chem.*, March, 1924, pp. 290–295.

VITAMINS.—Studies of the vitamin potency of cod-liver oil. Part VI. The effect of storage of livers on the vitamin A potency of cod-liver oil. A. D. Holmes. *J. Ind. Eng. Chem.*, March, 1924, pp. 295–297.

GLUE.—Standard methods for determining viscosity and jelly strength of glue. *J. Ind. Eng. Chem.*, March, 1924, pp. 310–315.

ANALYSIS.—Simplification of the separation of zinc from iron and aluminium. E. G. R. Ardagh and G. R. Bongard. *J. Ind. Eng. Chem.*, March, 1924, pp. 297–299.

The assay of zinc ores. Use of powdered magnesium for removing copper and lead. E. G. R. Ardagh and G. R. Bongard. *J. Ind. Eng. Chem.*, March, 1924, pp. 300–301.

DYESTUFFS.—Recent progress in the vat dyestuff industry. Part I. B. De Puyster. *Color Td. J.*, March, 1924, pp. 88–92.

Causes of fire in dyestuff plants. W. D. Milne. *Chem. Met. Eng.*, March 10, 1924, pp. 388–390.

DYEING.—Peculiarities in dyeing due to fibre structure. J. M. Matthews. *Color Td. J.*, March, 1924, pp. 93–97.

Classification of the methods of dyeing wool. Part I. J. M. Matthews. *Color Td. J.*, March 1924, pp. 77–81.

The dyeing of cellulose acetate artificial silk. A. J. Hall. *Textile Col.*, March, 1924, pp. 153–157.

MOLASSES.—Possibilities of beet molasses. W. J. Geldard. *Chem. Met. Eng.*, March 10, 1924, pp. 394–397.

ACIDS.—Present status of the contact sulphuric acid industry in Russia. J. R. Minevitch and W. M. Malisoff. *Chem. Met. Eng.*, March 10, 1924, pp. 384–388.

ABSORPTION.—Rate of absorption of water by rubber. D. H. Andrews and J. Johnston. *J. Amer. Chem. Soc.*, March, 1924, pp. 640–650.

A method of studying the rapid absorption of gases by liquids. P. G. Ledig and E. R. Weaver. *J. Amer. Chem. Soc.*, March, 1924, pp. 650–657.

German

THIOSULPHATES.—Contribution to the study of thiosulphates. F. Foerster and E. T. Mommsen. *Ber.*, February 6, 1924, pp. 258–263.

ACIDS.—A new synthesis of nitranilic acid. H. O. Meyer. *Ber.*, February 6, 1924, pp. 326–328.

5-Nitro-barbituric acids. H. Biltz and K. Sedlatscheck. *Ber.*, February 6, 1924, pp. 339–349.

CELLULOSE.—Esterification and mercerisation of cellulose. R. O. Herzog and G. Londberg. *Ber.*, February 6, 1924, pp. 329–332.

CARBAZOLE.—The chemistry of carbazole. H. Lindemann. *Ber.*, March 12, 1924, pp. 555–559.

HYDROGENATION.—Catalytic hydrogenation under pressure in the presence of nickel salts. Part VIII. Compounds of the indole series. J. v. Braun, O. Bayer and G. Blessing. *Ber.*, March 12, 1924, pp. 392–403.

HYDRIDES.—Tin hydride. W. Vaubel. *Ber.*, March 12, 1924, pp. 515–517.

Boron hydrides. Part VII. Pentaboron hydride. A. Stock and W. Siecke. *Ber.*, March 12, 1924, pp. 562–575.

OZONE.—Ozone in flames. W. Manchot and E. Bauer. *Z. anorg. u. allg. Chem.*, March 10, 1924, pp. 341–360.

PHOTO-CHEMISTRY.—The photochemical decomposition of silver chloride. R. Schwarz and P. Gross. *Z. anorg. u. allg. Chem.*, March 10, 1924, pp. 389–403.

Polymerisation and depolymerisation by light of different wave-lengths. Part I. *p*-Vinyl-anisol and its polymers. H. Stobbe and K. Toepfer. *Ber.*, March 12, 1924, pp. 484–491.

ANTIMONY COMPOUNDS.—The preparation of potassium antimonate. S. A. Schou. *Z. anorg. u. allg. Chem.*, March 10, 1924, pp. 404–410.

HYDROGEN.—The contamination of hydrogen with sulphur and a sensitive method for detecting the smallest quantities of sulphur. W. Prandtl. *Z. anorg. u. allg. Chem.* March 10, 1924, pp. 361–371.

HYDRAZINE.—The hydrogenating, reducing and oxidising action of hydrazine on organic compounds. E. Müller and H. Kraemer-Willenberg. *Ber.*, March 12, 1924, pp. 575–583.

Patent Literature

Abstracts of Complete Specifications

211,536. Silicious Metal Bearing Minerals, Treatment of. A. J. Moxham, 101, Park Avenue, New York. Application date, October 24, 1922.

The process is for treating iron ore which contains so much silicious matter and other non-ferric ingredients that it cannot be worked by the usual methods. By this process, iron and steel of great purity can be obtained, and also pure by-products such as alumina, potash, manganese, phosphorus, nickel, and silica. In treating an ore such as hæmatite or limonite, the ore is leached with sulphuric acid having a specific gravity of 1·35–1·45 at a temperature just below boiling. The liquid and solid materials are caused to flow in counter current during the reaction, and the residue is then washed to extract all metallic sulphates. The next step is to convert the metallic salts into oxides. The solution is nearly saturated and nearly neutral, and the salts are deposited by heating or by adding concentrated sulphuric acid. The salts are then heated to expel sulphur trioxide gas, which is recovered by condensing it in sulphuric acid, thus producing a concentrated acid which may be used for further leaching operations. Most of the iron is dissolved as ferric sulphate, but any ferrous sulphate which may be present evolves sulphur dioxide on heating which may be separately collected if of sufficient quantity.

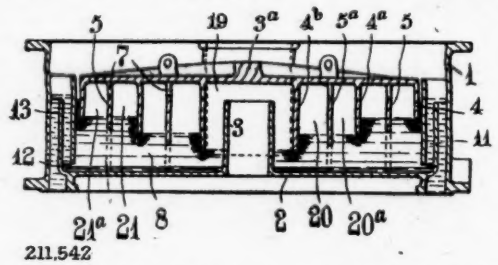
If the sulphates are heated to 650° C., the sulphates of iron and aluminium are decomposed, but not the sulphates of nickel and manganese, so that the latter may be separated by solution in water. The latter may be separated from each other by precipitating the nickel as oxalate and removing it. The residue of iron, aluminium and phosphorus oxides is mixed with sodium carbonate and passed through a heated rotary kiln to expel all carbon dioxide, yielding iron oxide, sodium aluminate, and sodium phosphate. The latter are separated by solution in water, leaving the iron oxide in a pure form. The oxide is obtained in a very finely divided form which is not suitable for treatment in a blast furnace, but it may be reduced in a rotary kiln and melted in an electric furnace, or may be reduced and melted in the electric furnace. The reduction may be effected in a blast furnace by using a downward draught so that the iron oxide is carried towards the melting zone. The solution of sodium aluminate and sodium phosphate is treated with carbon dioxide to precipitate aluminium hydroxide and forms sodium carbonate which is used in the previous stage of the process. If the mixed sulphates contain a large quantity of aluminium sulphate they may be treated with water to cause a partial separation of the less soluble aluminium sulphate. The mixed oxides are obtained free from silica, and are particularly suitable for the manufacture of iron and/or aluminium. As an alternative method for separating the aluminium, the sulphate may be combined with potassium sulphate to produce potash alum which is crystallised out.

211,541. Indophenolic Bodies, Manufacture of. Burt, Boulton and Haywood, Ltd., Salisbury House, London, E.C.2. and F. D. Miles, 67, Eglinton Road, Ardrossan, Ayrshire. Application date, October 26, 1922.

Para nitrosophenol or a homologue is condensed with carbazole or other compound capable of producing an indophenolic body by mixing the sulphuric acid solution of the two or by introducing an equi-molecular mixture into a large volume of sulphuric acid. In this invention, sulphuric acid solutions of the two bodies are caused to flow simultaneously into the reaction vessel in molecular proportions, and the product is precipitated from the mixture as soon as practicable after its formation. The solutions may be cooled to –8° C. before mixing, and are vigorously stirred during mixing. The mixing chamber is as small as practicable, so that the mixed solution may be removed to the precipitating vessel as quickly as possible.

211,542. Fractionating, Distilling or Scrubbing Column. M. Mackenzie, 33, Cross Hill, Ecclesfield, near Sheffield; J. Silvester, Lane End, Hoyland Common, near Barnsley; and E. Outwin, Barnsley Road, Thorpe Hesley, near Rotherham. Application dates, November 2, 1922, and February 16, 1923.

The fractionating column is of the kind comprising a number of superposed trays, each provided with a hood arranged in a vertical casing so that the liquid flows downwards from each tray to the next. One of the trays with its hood is shown in the illustration. The tray is provided with a central conduit 3, and the hood with downwardly directed webs 4, 4^a, 4^b, and with intermediate webs 5, 5^a, the lower edges of which are serrated. Openings 7 are provided in these webs

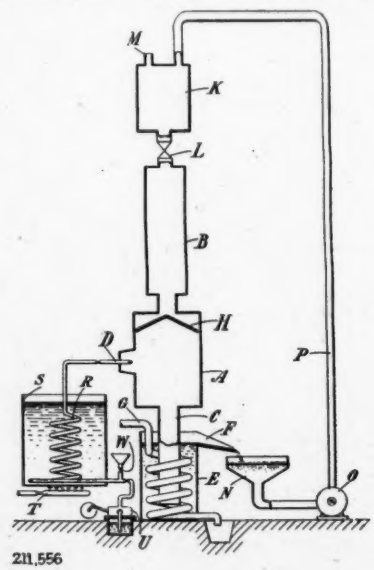


211,542

above the normal liquid level. The heavier liquid collecting at the bottom of the tray is discharged over a weir 13 to the tray next below. The webs 4, 4^a, 4^b under the edges of which the vapour passes decrease in depth from the centre outwards, and the intermediate webs 5, 5^a are of such a depth that the vapour will not pass below them. The vapour spaces 19, 20, 20^a, 21, 21^a are of increasing volume so that the vapour expands as it passes outwards. In the application to the treatment of benzolised oil obtained by scrubbing coke-oven gas by a suitable oil, the separation of the hydrocarbons of lower boiling point is effected in a column of these trays. The provision of the overflow device 13 prevents the accumulation of condensed water and condensates of higher density which would prevent the proper fractionation of the benzol vapour. For this purpose it is necessary that the condensate should be comparatively free from water and progressively lighter as the column is ascended.

211,556. Crystallisation. N. E. Siderfin and W. V. Shannan, of The Gas Light and Coke Co., Beckton, London, E.16, and The Gas Light and Coke Co., Horseferry Road, Westminster, London, S.W.1. Application date, November 18, 1922.

A solution of the substance to be crystallised is heated at a pressure above the vapour tension of the solution at the temperature employed, and the hot solution is then sprayed



211,556

into a space at lower pressure to bring about rapid cooling and crystallisation. The method is particularly applicable to the manufacture of commercially pure *p*-nitraniline. The

expansion chamber A opens at the top into a scrubbing tower B and discharges at the bottom by liquid sealed pipe C into a vessel E, which may be provided with a cooling coil G. The scrubber B is provided with the usual spreaders and the chamber A is provided with a spreader H at the top to distribute washing liquor from the scrubber. The liquid containing crystals is discharged at an overflow F on to a filter N, which may be a centrifugal separator, and the filtrate is forced by a pump O through a pipe E to the supply tank K for use again. A charge of *p*-nitrochlorbenzol is run into the lower end of the coil R through the branch W. Ammonia solution is then introduced, and the temperature is raised to 180° C. by heating the oil bath S, the valves being closed. Ammonia is then pumped into the coil until the pressure is about 700 lb. per square inch, under which conditions *p*-nitraniline is formed. The mixture is then admitted to the nozzle D which sprays it into the chamber A, and *p*-nitraniline is crystallised by the reduction of temperature and pressure. Water is simultaneously discharged through the scrubber B, and ultimately becomes a saturated solution of *p*-nitraniline, thus avoiding loss of this material in the solution. The *p*-nitraniline is very finely divided, and is of high purity, so that it is directly suitable for the production of dyes. The ammonia gas used in the manufacture may be separately recovered by reducing the amount of absorption liquor.

211,664. MINERAL OILS, TREATMENT OF. V.L. Oil Processes, Ltd., and O. D. Lucas, Vickers House, Broadway, Westminster, London. Application date, January 19, 1923.

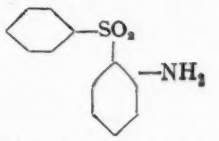
The process is for removing impurities such as sulphur from mineral oils by the action of ammonia on the oils. It is found that the reaction products produced by the ammonia and the impurities in the oil should not exceed a certain proportion of the reacting substances, depending on the conditions. Under some conditions, the reactions become reversible, so that the original impurities may return to the oil. In this invention, these reaction products are removed at intervals, followed by further ammonia treatment, so that the proportion does not reach that at which reversion may take place. It is known that hydrogen sulphide dissociates in increasing proportion with increasing temperature, so that the concentration of hydrogen sulphide must be less as the temperature rises. Hydrogen sulphide may be eliminated by a compound such as sodium plumbite or stannate by passing the treated oil through a chamber containing the reacting material after separating out the solid sulphides. The oil may be treated as a liquid or vapour, and in the latter case the hydrogen sulphide can be removed by passing the vapours through suitable solutions under pressure, or by passing the vapour over reagents such as hydrated ferric or lead oxide or bauxite.

211,720. DYEING ACETYL CELLULOSE. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester; J. Baddiley and A. Shepherdson, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, March 8, 1923.

Amino-anthraquinones are known as intermediate products for the manufacture of dyestuffs, but have not been regarded as dyestuffs themselves. It is now found that these derivatives have a very good affinity for acetyl silk, giving fast yellow to blue shades. Most of these derivatives are insoluble in water and only slightly soluble in acid solutions, but it is found that dyeing may be effected when the amino derivative is in fine suspension or colloidal form. The amino derivatives employed include the amino and diamino anthraquinones and the amino and diamino-methyl- and hydroxy-anthraquinones and the simple alkyl derivatives of these. Remote derivatives such as indanthrene blue, indanthrene bordeaux, or the benzoylated amino-hydroxy-anthraquinones or products containing carboxylic or sulphonic acid groups are not included. The shades obtained with a few examples are:—1-amino-anthraquinone—yellow; 1-amino-2-methyl-anthraquinone—yellow-orange; 1-methyl-amino-anthraquinone—red; 1-4-diamino-anthraquinone—violet; 1 : 5-diamino-anthraquinone—red; diamino-anthrarufin—blue; 1 : 4-amino-oxyanthraquinone—crimson; methylated diamino-anthrarufin—sky-blue. The finely ground solid may be suspended in water and the fibre heated in it gradually, preferably with an emulsifying agent such as soap or turkey red oil, until the desired shade is obtained. Alternatively, the amino derivative may be subjected to colloidal grinding, or the amino derivative may be dissolved and then precipitated in a finely divided form, especially if a protective colloid such as sulphonated oil is used as the solvent.

211,742. MONO-AZO-DYESTUFFS, MANUFACTURE OF. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, April 9, 1923. Addition to 169,863.

Specification No. 169,863 (see THE CHEMICAL AGE, Vol. V, p. 602) describes the manufacture of amino-azo-dyestuffs by coupling a diazo derivative of a monc acidyl-diamino diaryl-sulphone with β-naphthylamine or a substitution product. In this invention, new azo dyestuffs are derived from a series of sulphonated ortho-amino-diarylsulphones having two benzene nuclei connected by an SO_2 group; the NH_2 group which is capable of being diazotised is in one of the ortho positions relatively to the SO_2 group, while an SO_3H group is in one of the two benzene nuclei, which may also contain other substituents such as halogens, CH_3-groups, or NHCOR. The diazo derivative of a sulphone having the characteristic group



is coupled with an aromatic amine which is not sulphonated and contains at least 10 atoms of carbon all forming part of aromatic nuclei such as a naphthylamine or an N-aryl, N-arylkyl or N-alkyl derivative and an N-aryl or N-arylkyl derivative of aniline or its homologues, to obtain new acid dyestuffs. Several examples are given.

211,752. AZO-DYESTUFFS, MANUFACTURE OF. A. G. Bloxam, London. From Chemische Fabrik Griesheim-Elektron, Frankfurt-on-Main, Germany. Application date, April 25, 1923.

These azo dyestuffs are obtained by combining tetrazo compounds of diamino azo bodies not containing a sulphonic group with an aryl-amide of 2 : 3-oxy-naphthoic acid. These dyestuffs are insoluble in water. Suitable diamino bodies are diamino-azobenzene and those containing at least one amino group in para position to the azo group. These are obtained by coupling a diazotised nitroamino base or a diazotised monoacyl-diamino body with an amine which can be combined in para position, and by subsequent reduction or saponification respectively. Components mentioned are meta and para-nitraniline and their derivatives such as chloro-nitraniline, nitro-toluidines, nitro-anisidines, nitroamino-thiophenol-methyl-ethers, nitronaphthylamines, and the corresponding monoacyl diamines; and meta-toluidine, paraxylidine, para-cresidine, acetyl-meta-toluylene-diamine, α-naphthylamine and its derivatives which can be combined in 4-position. The ethers mentioned are obtained by condensing methyl mercaptan with a dinitrochlorbenzene, the dinitrothiophenol-methyl-ether being partly reduced to convert one of the nitro groups into an amino group.

Azo components mentioned are arylamides of 2 : 3-oxy-naphthcic acid such as the anilide, a toluidide, an anisidide, a phenetidide, the α or β naphthalide, an aryl amide having chlorine as a substituent in the arylido residue, 2 : 3-oxynaphthoyl-amino-thiazol, etc.

A large number of examples of these dyestuffs giving blue to black shades are given.

211,791. AMMONIUM CHLORIDE DYES IN IRON VESSELS, TREATMENT OF. Henkel and Cie., 67, Heyestrasse, Düsseldorf-Holthausen, Germany, and W. Weber, 10-14, Kasernenstrasse, Düsseldorf, Germany. International Convention date, May 24, 1923. Addition to 195,947.

Specification No. 195,947 (see THE CHEMICAL AGE, Vol. VIII., p. 626) describes a method for protecting from corrosion iron vessels in which ammonium chloride lyes are treated, by passing a weak direct electric current through an iron anode to the iron vessel. Difficulties are experienced in maintaining the uniform intensity of cathode current which is necessary, and this is obtained in the present invention by surrounding the iron anode rods by tubes of vulcanite

or porcelain, and feeding the rods into the liquid only to the extent necessitated by the strength of the electric current.

211,802. VAT COLOURING MATTERS, MANUFACTURE AND PRODUCTION OF. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, August 15, 1923.

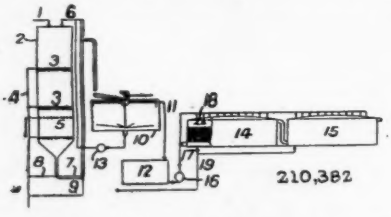
Oxidation products of dibenzanthrone which may be subsequently reduced are converted into vat colouring matters by condensing with an aryl-chloroform with or without solvents or diluents. These dystuffs may be improved by treating them with an agent giving off halogen with or without diluents or catalysts. The aryl-chloroform used is benzotrichloride or a derivative. Examples are given.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—184,473 (J. N. A. Sauer), relating to a process for purifying liquids, see Vol. VII., p. 538; 189,148 and 208,555 (Algemeene Norit Maatschappij), relating to production of decolorising carbon, see Vol. VIII., p. 127, and Vol. X., p. 202; 195,365 (Appareils et Evaporateurs Kestner), relating to evaporating apparatus for concentrating acid liquids, see Vol. VIII., p. 599; 196,258 (Verein für Chemische und Metallurgische Produktion), relating to production of chemically pure hydrochloric acid, see Vol. VIII., p. 653; 200,074 (L. Duparc), relating to alloys, see Vol. IX., p. 265; 201,879 (Chief Consolidated Mining Co.), relating to treatment of silicious ores, see Vol. IX., p. 377.

International Specifications not yet Accepted

210,382. PURIFYING GASES. Koppers Co., 800, Union Arcade Building, Pittsburg, U.S.A. Assignees of C. J. Ramsburg, 800, Union Arcade Building, Pittsburg, U.S.A. International Convention date, January 24, 1923.

In the process described in Specification 207,488 (see THE CHEMICAL AGE, Vol. X., p. 122), for removing sulphuretted hydrogen and hydrocyanic acid from coke oven gas in a number of stages, the last stage now employs a solution freed from sulphuretted hydrogen by treating with iron, manganese,



lead, zinc or other metal compound, *e.g.*, a suspension of soft hæmatite ore. Sodium carbonate solution is fed to a vessel 2 and mixed with iron oxide suspension from a Dorr thickener 10. Compressed air is supplied from a pipe 4 to branches 3 to agitate the mixture, and the temperature is raised to 50° C. by a steam coil 5. The mixture passes through a pipe 7 to the thickener 10 to separate the solid matter, and the solution passes to a tank 12 where it is cooled. The solution is then forced by a pump 16 to the scrubbers 14, 15, and then returns by the pipe 19 to the first stage. The iron oxide is regenerated periodically.

210,399. FERTILISERS. Soc. Chimique de La Grande Paroisse (Azote et Produits Chimiques), 13, Rue des Saussaies, Paris. International Convention date, January 24, 1923.

A mineral containing potassium chloride is treated with ammonium bicarbonate in presence of water. The mineral may be added to the solution from which sodium bicarbonate has been separated after reaction between ammonium bicarbonate and sodium chloride, the liquor being then treated with ammonia and carbon dioxide, which precipitates ammonium and potassium chlorides. This mixture is used as a fertiliser.

210,402. DISTILLING SOLID MATERIALS. M. C. J. E. de Loisy, 64, Rue la Boetie, Paris, and E. Grauce, Saone et Loire, France. International Convention date, January 27, 1923.

Coal, lignite shale, or wood are distilled by means of hot gas passing through the material. The gas obtained is partly burned with air, and the products are reduced in temperature by adding a cold gas or steam. This gas is then used for distilling the material. The temperature of the heating gas is about 480° C. The gas may be heated in a coil without mixing with the combustion products.

LATEST NOTIFICATIONS.

212,864. Manufacture of cellulose solution. Dr. L. Lilienfeld. March 15, 1923.

212,865. Process for the production of viscose. Dr. L. Lilienfeld. March 15, 1923.

212,879. Centrifugal pumps. H. Giesberger. March 15, 1923.

212,883. Furnace for chemical reactions. Naamlooze Vennootschap Stikstofbindingsindustrie Nederland. March 13, 1923.

212,936. Manufacture of black vat dyestuffs. Compagnie National de Matieres Colorantes et de Produits Chimiques. March 16, 1923.

Specifications Accepted, with Date of Application

188,667. Liquids, Process of treating. Naamlooze Vennootschap Algemeene Norit Maatschappij, November 14, 1921.

199,032. Ammonia, Process for the synthetic production of. C. Urfer. June 12, 1922.

206,158. Formaldehyde, Apparatus for the production of—by catalysis. Soc. des Etablissements Barbet. October 30, 1922.

209,389. Purification of brown coal wax. E. von Boyen. January 8, 1923.

212,311. Caking Fuel, Process of and apparatus for utilising in gas producers. A. H. Lymm. December 8, 1922.

212,355. Tanks and other objects with acid resisting linings and coverings, Construction of. F. E. Elmore and Chemical and Metallurgical Corporation, Ltd. January 10, 1923.

212,436. Minerals and other substances, Apparatus for washing. R. A. Henry. April 4, 1923.

212,442. Colloidal solutions, High-frequency method for the preparation of. S. H. Long. April 16, 1923.

212,453. Purifying or softening water by means of base exchanging compounds, Means for use in—and for regenerating the compounds when spent. T. P. Hilditch, H. J. Wheaton, and J. Crosfield and Sons, Ltd. May 10, 1923.

212,461. Oils and fats from oil or fat bearing material, Extraction of. J. Lewis. May 22, 1923.

Applications for Patents

Beckett, E. G., Scottish Dyes, Ltd., Thomas, J., and Tonkin, R. Dyestuffs and intermediates. 7,255. March 21.

Beldam, W. R. Straining or filtering apparatus. 7,040. March 19.

Brégeat, J. H. Purification of products using alcohol as a solvent. 7,086. March 19. (Austria, December 15, 1923.)

British Dyestuffs Corporation, Ltd. Manufacture of hydroxy benzaldehydes. 7,057. March 19.

Charpentier, M. H., and Henneberg, G. Manufacture of fuel alcohol. 7,152. March 20. (France, June 20, 1923.)

Charpentier, M. H. Manufacture of fuel alcohol. 7,153. March 20. (France, December 10, 1923.)

Chemische Fabrik Von Heyden Akt.-Ges. Manufacture of soluble antimony compounds. 7,378. March 22. (Germany, March 23, 1923.)

Distillers Co., Ltd., and Meyer, E. A. Dehydrating alcohol. 7,361. March 22.

Hirchberg, L. M. Treatment of hydrocarbon oils. 6,817. March 17.

Hodgson, H. H. Manufacture of hydroxy benzaldehydes. 7,057. March 19.

Kernot, J. C. Manufacture of glue, gelatine, and meal from fish offal, etc. 6,943. March 18.

McCowatt, W., and Weir, Ltd., G. and J. Centrifugal, etc., pumps. 7,346. March 22.

Naef and Co., M. Manufacture of *d. l*-nerolidol. 6,824. March 17. (Switzerland, March 22, 1923.)

Naef and Co., M. Manufacture of farnesol. 6,825. March 17. (Switzerland, March 22, 1923.)

New York Zinc Co., Inc., and Wade, W. R. Dehydrating minerals. 6,953. March 18. (United States, March 28, 1923.)

Pollak, F. Manufacture of condensation products from urea, etc., and formaldehyde. 7,297. March 21. (Austria, March 31, 1923.)

Standard Development Co. Manufacture of metallo-organic compounds. 7,382. March 22. (United States, April 13, 1923.)

United Alkali Co., Ltd. Means for effecting absorption of gases. 7,268. March 21.

Weygang, R. C. W. Manufacture of soluble or miscible oils, greases and fats. 7,178. March 20.

Patents Court Case

APPLICATION has been made under Sec. 24 of the Patents and Designs Acts 1907 and 1919, for the following patent to be indorsed "Licences of Right":—159878 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab) relating to a process for the manufacture of ammonia.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, March 27, 1924.

TRADE has been moving along somewhat quiet lines during the current week and there is little of interest to report. Prices generally are maintained and doubtless, with an improvement in business, advances would be registered in a number of products. Export trade has been somewhat slow and inquiry on the small side.

General Chemicals

ACETONE is a shade easier but in slightly better demand.
ACID ACETIC maintains its value and is in good request.
ACID CITRIC is unchanged.
ACID FORMIC is scarce and in good demand.
ACID LACTIC.—Price unchanged and in fair request.
ACID OXALIC is a moderately active market, without change in value.
ACID TARTARIC maintains its price.
BARIUM CHLORIDE is firm and in much better demand.
BLEACHING POWDER is unchanged.
CREAM OF TARTAR is interesting and a better demand is in evidence.
FORMALDEHYDE continues firm and may be expected to advance shortly.
LEAD ACETATE continues very scarce and high prices are paid for near delivery.
METHYL ALCOHOL continues its advance and is very scarce on the spot.
POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.
POTASSIUM PERMANGANATE has registered a decline and is only in small demand.
POTASSIUM PRUSSIATE maintains its value but is only in small request.
SODIUM ACETATE is firm and scarce.
SODIUM BICHROMATE.—An active business is being transacted at British makers' figures.
SODIUM NITRITE is in fair demand with price firm.
SODIUM PRUSSIATE is unchanged in value, but slightly more interest is being taken in the product.
SODIUM SULPHIDE is unchanged.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID remains unchanged, but may improve as prices on the Continent are firm.
ACETANILID is easier.
ACID SALICYLIC is cheaper.
AMIDOL tends to harden.
BROMIDES are in better demand and rather firmer.
MERCURIALS are firm in sympathy with mercury.
PHENACETIN is unchanged.
PHENAZONE may improve.
PHENOLPHTHAIEIN, like other products largely dependent upon phenol, has been in buyers' favour.
SODIUM SALICYLATE is steadier.
VANILLIN in good demand; Continental makers are sold ahead and quote above the parity ruling in this market.

Coal Tar Intermediates

Business continues on moderate lines, although there is fair export inquiry and prices on the whole reamain steady.

ALPHA NAPHTHOL is in rather short supply.
ALPHA NAPHTHYLAMINE is of fair interest without change in value.
ANILINE OIL AND SALT have been inquired for on export account.
BENZIDINE BASE.—Some home trade business has been placed.
BETA NAPHTHOL is of interest for export, the home market being unchanged.
DIMETHYLANILINE is in moderate request.
DIPHENYLAMINE is unchanged.
"H" ACID.—Business has been secured for home market.
NITRO BENZOL has been passing into consumption, and there is fair export inquiry.
PARANITRANILINE.—Some home trade business has been secured.
"R" SALT is of fair interest for export.
RESORCIN has been of less interest than of late.
XYLIDINE is without special interest.

Coal Tar Products

There is little change in the market price of coal tar products since last week.

90 % BENZOL remains unchanged at 1s. 7d. per gallon on rails.
PURE BENZOL is also unchanged at 1s. 11d. per gallon on rails.
CREOSOTE OIL is steady at 8d. to 8¼d. per gallon on rails in the North, while the price in London is from 9d. to 9¼d. per gallon.
CRESYLIC ACID is also unchanged, and is quoted at 2s. to 2s. 1d. per gallon on rails for the Pale quality 97-99%, while the Dark quality 95-97% is quoted at 1s. 9d. to 1s. 10d. per gallon on rails.
SOLVENT NAPHTHA is firm at 1s. 2d. to 1s. 3d. per gallon on rails.
HEAVY NAPHTHA is worth 1s. to 1s. 1d. per gallon on rails.
NAPHTHALENES have little fresh inquiry, the lower qualities being worth from £7 to £7 10s. per ton, the 74-76 quality £8 to £8 10s. per ton, while 76-78 quality is worth from £9 to £9 10s. per ton.
PITCH is quiet and prices are steady. To-day's values are 65s. to 70s. f.o.b. London, 62s. 6d. to 65s. f.o.b. East and West coast ports.

Sulphate of Ammonia

The demand is still maintained and prices are unchanged.

[*Current Market Prices on following pages.*]

The Importance of Lime to the Land Cultivator

A GREAT deal of land cannot grow proper crops or make use of the manure it receives because of the lack of lime. On soils deficient in lime, clovers do not grow freely and all crops are more subject to disease; turnips in particular suffer from "finger-and-toe." Heavy soils will dry more quickly and work more easily after liming. On many soils you cannot possibly get good crops or good tilth without lime.

The presence of foxgloves in the hedgerows, or of spurrey, sheep's sorrel, or corn marigold among the weeds of arable land, are sure signs of lack of lime in the soil. In doubtful cases farmers can always get the agricultural organiser for the county to arrange for the examination of a sample of soil to see whether the land needs lime. A deficiency in lime can be best supplied either by: (1) Quick-lime, lump or ground; or (2) carbonate of lime, either as ground limestone or ground chalk (the more finely ground the better).

Quick-lime is to be preferred to carbonate of lime on heavy clay soil; on rich soils or light land it is safer to use carbonate of lime. Not less than one ton nor more than two tons of burnt lime in lump should be used per acre, and it is best put on in the late autumn or winter before cultivating or harrowing, in order to get it well mixed with the soil. Carbonate of lime can be put on at any time of the year, but it is always best to get it well worked into the soil before sowing. From one to two tons to the acre should be applied. For spring-sown crops a dry time in early spring should be chosen for harrowing in the lime. The dressing either of quick-lime or carbonate of lime should be repeated once in each rotation or about every fifth year.

The effect of liming is not always to be seen in the first crop, but on soils deficient in lime it will increase the average crop production by 10 per cent., and on clay soils it will reduce the draught of implements by 10 per cent. to 20 per cent.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	120	0	0	to	123	0	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	51	0	0	to	53	0	0
Acetic, 40% pure	ton	26	0	0	to	27	0	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7½	to	0	0	8
Citric	lb.	0	1	5½	to	0	1	6
Formic, 85%	ton	65	0	0	to	68	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol	ton	39	0	0	to	40	0	0
Lactic, 60 vol	ton	45	0	0	to	47	0	0
Nitric, 80 Tw	ton	23	0	0	to	25	0	0
Oxalic	lb.	0	0	5½	to	0	0	5¾
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	1½	to	0	1	2
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	10	0
Sulphate, 17–18%	ton	8	10	0	to	9	10	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	5	to	0	1	6
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	65	0	0	to	66	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	10	0	to	15	0	0
Nitrate	ton	37	0	0	to	40	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to	—		
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	22	0	0	to	23	0	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	25	0	0	to	25	10	0
Cream Tartar, 98–100%	ton	80	0	0	to	85	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol	ton	65	0	0	to	66	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts, commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols	gal	0	2	0	to	0	2	1
Iron perchloride	ton	20	0	0	to	22	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	53	0	0	to	55	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	50	0	0	to	51	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	0	0	to	4	5	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	9	0	0	to	10	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	48	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	85	0	0	to	86	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	5¾	to	—		
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to	—		
Metabisulphite, 50–52%	ton	63	0	0	to	65	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	9½	to	0	0	10
Prussiate, red	lb.	0	1	10	to	0	2	0
Prussiate, yellow	lb.	0	0	9½	to	0	0	10
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to	—		
Seconds	cwt.	2	17	6	to	—		
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	—		
Bisulphite, 60–62%	ton	20	0	0	to	22	0	0
Chlorate	lb.	0	0	2¾	to	0	0	3
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	29	0	0	to	30	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	5¾	to	0	0	6
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62%	ton	15	0	0	to	16	10	0
Sulphite, cryst	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	1	0	to	0	1	1
Tin perchloride, 33%	lb.	0	1	4	to	0	1	5
Perchloride, solid	lb.	0	1	5	to	0	1	6
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	10
Zinc chloride 102° Tw	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	6	to	0	3	9
Acetanilid	lb.	0	2	10	to	0	3	0
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	10	to	0	3	3
Salicylic, B.P.	lb.	0	2	0	to	0	2	2
Tannic, leviss	lb.	0	3	0	to	0	3	3
Amidol	lb.	0	8	0	to	0	8	6
Amidopyrin	lb.	0	13	9	to	0	14	3
Ammon ichthosulphonate	lb	0	1	10	to	0	2	0
Barbitone	lb.	0	16	0	to	0	16	6
Beta naphthol resublimed	lb.	0	3	0	to	0	3	6
Bromide of ammonia	lb.	0	0	10	to	0	1	0
Potash	lb.	0	0	8	to	0	0	8½
Soda	lb.	0	0	8½	to	0	0	9
Caffeine, pure	lb.	0	12	3	to	0	12	9
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	10	to	0	2	0
Calomel	lb.	0	3	4	to	0	3	6
Chloral hydrate	lb.	0	3	10	to	0	4	0
Cocaine alkaloid	oz.	1	1	0	to	1	2	6
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	2	10	to	0	3	0
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	1	to	0	2	3
B.P. (75–80% eucalyptol)	lb.	0	2	2	to	0	2	4
Guaiacol carbonate	lb.	0	12	9	to	0	13	0
Liquid	lb.	0	11	6	to	0	12	0
Pure crystals	lb.	0	12	6	to	0	13	0
Hexamine	lb.	0	4	0	to	0	4	3
Hydroquinone	lb.	0	4	0	to	0	4	3
Lanoline anhydrous	lb.	0	0	7	to	0	0	8
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	8	to	0	3	0
Metol	lb.	0	9	6	to	0	10	6
Milk sugar	cwt.	4	0	0	to	4	5	0
Paraldehyde	lb.	0	1	5	to	0	1	7
Phenacetin	lb.	0	6	9	to	0	7	0
Phenazone	lb.	0	7	6	to	0	8	0
Phenolphthalein	lb.	0	7	6	to	0	7	9
Potassium sulpho guaiacolate	lb.	0	6	3	to	0	6	9
Quinine sulphate, B.P.	oz.	0	2	3	to	—		

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	6	0	to	0	6	6
Salicylate of soda powder	lb.	0	2	8	to	0	2	9
Crystals	lb.	0	2	9	to	0	2	10
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	3	3	to	0	3	6
Sulphonal	lb.	0	17	6	to	0	18	3
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb.	0	8	6	to	0	9	0
Vanillin	lb.	1	4	6	to	1	5	6

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8½	to	0	0	8¾
Salts	lb.	0	0	9	to	0	0	9¼
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	4	to	0	4	7
Sulphate	lb.	0	3	4	to	0	3	7
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Crocoine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	10	to	0	0	11
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	8	to	0	2	10
Diphenylamine	lb.	0	3	3	to	0	3	6
H-Acid	lb.	0	4	6	to	0	4	9
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	6	to	0	2	8
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.

		£	s.	d.
Anise	firm, c.i.f. 2/6 spot	0	2	4½
Bay		0	10	6
Bergamot		0	16	6
Cajuput		0	3	3
Camphor, white	per cwt.	3	15	0
Brown	„	3	15	0
Cassia	c.i.f. 7/9 spot	0	8	6
Cedarwood		0	1	6
Citronella (Ceylon)	c.i.f. 3/3 spot	0	3	7
(Java)	c.i.f. 4/6 spot	0	4	9
Clove		0	9	0
Eucalyptus		0	2	3
Geranium Bourbon	firmer	1	10	0
Lavender		1	5	0
Lavender Spike		0	6	0
Lemon		0	3	3
Lemongrass	per oz.	0	0	2¾
Lime (distilled)	dearer	0	4	9
Orange sweet (Sicilian)	„	0	13	0
(West Indian)	„	0	10	0
Palmarosa		0	18	0
Peppermint (American)		0	18	6
Mint (dementholised Japanese)		0	17	0
Patchouli		1	2	6
Otto of Rose	per oz.	1	15	0
Rosemary		0	1	11
Sandalwood		1	5	0
Sassafras		0	10	6
Thyme	2/6 to	0	8	0

Synthetics.

		£	s.	d.
Benzyl acetate	per lb.	0	3	6
Benzoate	„	0	3	6
Citral	„	0	10	0
Coumarine	„	1	0	0
Heliotropine	„	0	8	0
Ionone	„	1	5	0
Linalyl acetate	„	1	2	6
Methyl salicylate	„	0	2	9
Musk xylol	„	1	0	0
Terpeniol	„	0	2	9

Catalogues Received

DETAILS are given of the Brush-Ljungström 5,500 kw turbo-generator in a ten-page illustrated leaflet (No. 100/0-6a) issued by the BRUSH ELECTRICAL ENGINEERING CO., LTD., of Falcon Works, Loughborough. An interesting feature is the reproduction of charts showing the saving in coal consumption after the introduction of this turbo-generator at the Warrington and Stockport Corporation Electricity Works.

ENGINEERS have a tendency to regard the "Megger" insulation testers as a kind of "magic box" in which "you turn the handle and it does the rest." EVERSHED AND VIGNOLES, LTD., the makers of these instruments, of Acton Lane Works, Chiswick, London, W., have recently issued a new descriptive catalogue (153e), which describes the various types of instruments available, and also gives valuable hints for their use.

THE catalogue of chemicals produced by THE BRITISH DRUG HOUSES, LTD., of Graham Street, City Road, London, N.1, has just been re-issued. It contains the names and prices of between 3,000 and 4,000 different substances or preparations, classified as general organic and inorganic chemicals, analytical reagents, preparations for volumetric analysis, test reagents, standard stains for microscopy, and aniline dyes.

A REPRINT fromthe Transactions of the Optical Society has recently been issued by ADAM HILGER, LTD., 75a, Camden Road, London, dealing with the Hilger Microscope Interferometer. This is an instrument for measuring the aberrations of microscope objectives—a development of the Hilger interferometers for testing camera and other lenses. A number of possible arrangements are discussed and an actual instrument described. The routine of setting up an objective for test is also detailed. The paper was read before the Optical Society in April last and the discussion following it appears in the reprint.

A NICELY produced loose-leaf catalogue, describing and illustrating a number of works installations, has been issued by THE CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE CO., LTD., of 76, Victoria Street, London. The plants dealt with have been constructed for oil refining and pitching, tar distillation and dehydration, preparation of neutral sulphate of ammonia, benzol rectification, etc., all of which contain many special features patented by the firm. In addition there is a very complete description of the Wilton patent furnace, which is adaptable for use in any type of boiler used for steam raising.

MELDRUMS, LTD., of Timperley, Manchester, have recently brought out an improved design of acid-resisting centrifugal pump. This is illustrated and described in belt-driven and direct motor-driven forms in a leaflet, C25, issued by the firm. In previous designs the pump casing was split down the centre of the volute, resulting in the delivery branch being divided. In the new pattern the volute and delivery branch are in one casting, and a separate cover carrying the suction branch is bolted to it. This enables the whirlpool chamber and volute to be made of a more uniform shape, and, for a given speed and diameter of impellor, it is possible to get considerably higher lifts than with the earlier patterns.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, March 27, 1924.

BUSINESS in the heavy chemical market is still very slow, and while there has been a fair amount of inquiry the numbers of orders booked have been small.

Numerous offers continue to be received from Continental merchants, and prices named show little change on those last reported. Home manufactured products also remain steady.

Industrial Chemicals

ACID ACETIC.—Unchanged. Glacial, 98/100%, £62 to £70 per ton; 80% pure, £51 to £53 per ton; 80% technical, £47 to £50 per ton, all packed in casks delivered c.i.f. U.K. port, duty free. Moderate inquiry for export.

ACID BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton; carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at about 8d. to 8½d. per lb., carriage paid.

ACID CITRIC, B.P. CRYSTALS.—Quoted 1s. 5d. per lb., less 5%, carriage paid.

ACID FORMIC, 85%.—More spot material now available. Quoted £65 to £66 per ton, ex store. Offered for forward delivery at slightly less.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—In little demand and price unchanged at about 5½d. per lb. ex store, spot delivery. Offered from the Continent at about 5d. per lb., ex wharf, prompt shipment.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Moderate inquiry and price unchanged at 1s. 1½d. per lb., less 5% ex store. Offered for early delivery at 1s. 1¼d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—17-18%, iron free, offered from the Continent at £7 12s. 6d. per ton, c.i.f. U.K. port. Spot lots quoted £8 10s. per ton, ex store.

ALUM CHROME.—Potash chrome alum quoted about £27 per ton, ex station. Ammonium chrome alum about £20 to £21 per ton, ex store. Moderate inquiry for export.

ALUM POTASH (LUMP).—Spot lots quoted £10 15s. per ton, ex store. Offered from the Continent at about £9 12s. 6d. per ton, c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station, prompt delivery.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks delivered U.K.

AMMONIA LIQUID, 880.—Unchanged at 2½d. to 3d. per lb. delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Moderate inquiry for export. Grey galvanisers quality quoted £31 to £32 per ton, ex station or f.o.b. U.K. port. Fine white crystals offered from the Continent at about £26 per ton, c.i.f. U.K. port.

AMMONIA SULPHATE.—25¼%, £13 12s. per ton; 25¾% quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Spot lots unchanged at about £67 per ton, ex store, offered for early delivery at about £65 per ton, ex wharf.

BARIUM CARBONATE, 98/100%.—Continental material now quoted £11 10s. per ton, c.i.f. U.K. port, prompt shipment.

BARIUM CHLORIDE, 98/100%.—English material now offered at about £14 5s. per ton, ex store. Offered from the Continent at £13 10s. per ton, c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station; contracts, 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Continental on offer at £4 15s. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Quoted £3 5s. per ton, f.o.b. U.K. port, packed in casks.

COPPER SULPHATE.—Moderate inquiry quoted £25 per ton, ex store. Spot lots of Continental material on offer at slightly less.

FORMALDEHYDE, 40%.—Unchanged at £62 to £63 per ton, ex store, spot delivery, in little demand.

GLAUBER SALTS.—English material, £4 per ton, ex store or station. Continental offering at about £3 5s. per ton, c.i.f. U.K. port.

LEAD, RED.—Market very erratic. Continental material quoted £42 per ton, ex store, spot delivery.

LEAD, WHITE.—Remains unchanged at about £44 per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals still available at about £48 per ton, ex store. Brown about £46 10s. per ton, ex store. Continental prices higher. White quoted £46 per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—English ground material offered at £8 per ton, ex station. Moderate inquiry for export.

MAGNESIUM CHLORIDE.—Continental prices easier. Now on offer at about £3 5s. per ton, c.i.f. U.K. port. Spot lots quoted £3 15s. per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality quoted £5 per ton, ex store. B.P., £6 5s. per ton, ex station, prompt delivery.

POTASH CAUSTIC, 88/92%.—Offered for forward delivery at £30 10s. per ton, ex wharf. Spot lots about £32 to £33 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Now offered from the Continent at about £24 5s. per ton, c.i.f. U.K. port. Spot lots quoted £27 per ton, ex store.

POTASSIUM CHLORATE.—Little inquiry. Spot lots unchanged at about 3½d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE).—Offered from the Continent at £26 per ton, c.i.f. U.K. port, prompt shipment. Spot lots unchanged at about £31 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Nominally 9d. per lb., ex store, but could probably be obtained for less.

POTASSIUM PRUSSIATE (YELLOW).—Unchanged, at about 8¾d. per lb., f.o.b. U.K. port, or ex station, in little demand.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99%, powdered, £22 15s. per ton. All ex-station, spot delivery. Contracts, 20s. per ton less.

SODIUM ACETATE.—Spot lots unchanged at about £24 5s. per ton, ex store. Offered from the Continent at £22 10s. per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined re-crystallised quality, £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' price unchanged at 4½d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £10 per ton, ex station. Continental about £9 10s. per ton, c.i.f. U.K. port. Pea crystals quoted £15 per ton, ex store.

SODIUM NITRATE.—Refined, 96/98% quality, unchanged at £13 10s. to £13 15s. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRITE, 100%.—Quoted £27 to £28 per ton, according to quantity, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—Unchanged at about 5d. per lb., f.o.b. U.K. port. Spot lots on offer at about 5¼d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £4 5s. per ton, carriage paid stations. Good export inquiry.

SODIUM SULPHIDE.—60/65% solid, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more. 60/62% offered from the Continent at £13 7s. 6d. per ton, c.i.f. U.K. port; broken, £1 per ton more. 31/34% crystals, English make, £9 2s. 6d. per ton, ex station. 30/32% crystals, Continental make, £9 per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

TIN CRYSTALS.—Unchanged at 1s. 3d. per lb., f.o.b. U.K. port.

ZINC CHLORIDE, 98/100%.—Quoted £25 10s. per ton, f.o.b. U.K. port, for export.

ZINC SULPHATE.—English material quoted £13 10s. per ton, ex store, offered from the Continent at £12 per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ANTHRANILIC ACID.—Small home inquiry. Price 8s. lb., 100% basis, delivered.

ALPHA NAPHTHYLAMINE.—Some home demand. Price 1s. 5d. lb., delivered.

BETA OXYNAPHTHOIC ACID is in good demand for small quantities. Price 9s. 6d. lb., delivered.

BETA NAPHTHOL.—Small export inquiry. Price 1s. 1d. lb., f.o.b.

DINITROBENZOL.—Export inquiry. Price 10½d. lb., f.o.b.

H. ACID.—Some home inquiry. Price 4s. 4½d. lb., 100% basis.

META ZYLIDINE ACETATE.—Some home inquiry. Price 4s. 8d. lb., 100% basis, carriage paid.

AMIDOAZOBENZOL.—Small home inquiry. Price 2s. 11d. lb., delivered.

ORTHO AMIDOPHENOL SULPHONIC ACID.—Small export inquiry. Price 3s. 10d. lb., f.o.b.

TOLUYLENEDIAMINE SULPHONIC ACID.—Some export inquiry. Price 8s. 6d. lb., f.o.b.

Fuel Economy in the China Clay Industry

A WRITER calling attention to the urgent importance of fuel economy takes the case of the china clay industry as an example. The clay dried in the ordinary way, he says, will average from eight to ten tons per ton of coal. The consumption of fuel does not depend upon the quantity of clay dried, but upon the amount of moisture that is evaporated. Thus it is possible for a kiln drying eight tons of clay per ton of coal to be more efficient than another kiln drying ten tons per ton of coal, because in the first case the clay originally contained 60 per cent. of water and in the latter only 40 per cent. It will be found that some coals are far more suitable for clay drying than others. By means of a calorimeter the calorific value of the coal can be determined. Welsh steam coals will be found to give 14,500 b.t.u.'s per lb. of coal whilst commoner qualities will give from 11,500 to 13,000 b.t.u.'s. The relative values of the coal for drying purposes may be readily ascertained when these figures are known.

Oil Emulsions as Insecticides

THE problem of destroying the eggs and larvæ of insect pests in trees without damage to the tree is always a difficult one, and attention is drawn to a promising method by spraying with certain emulsified oils obtained from tar distillation, in a recent issue of the *Bulletin* (11 and 12 in one issue) published by Murphy and Son, Ltd., from their bio-technological laboratories in London, Leeds and Nottingham. Work in the United States has shown that such mixtures are very effective with many pests, and without deleterious action to the plant, provided the fractions emulsified are carefully selected and provided emulsification is complete and the product water-soluble. The oil used in these emulsions reaches a much higher concentration than the more usual 5 to 10 per cent. employed in this country in insecticides.

Tariff Changes

ZANZIBAR.—Chemicals to be used in the manufacture of soap locally may be imported free.

SPAIN.—The duty on compressed gases of all kinds is to be assessed on gross weight instead of net weight.

The Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, March 27, 1924.

BUSINESS in the chemical market here continues only on moderate lines and without any notable changes from my recent reports. So far as the home trade is concerned users are buying principally for immediate needs, the demand for future delivery being comparatively quiet. Some of the overseas markets are taking fair quantities of the staple heavies, and a number of inquiries, chiefly from the Dominions, continue to be reported. Several minor price concessions have been made since last week, but, on the whole, values have been maintained.

Heavy Chemicals

Prussiate of soda is a steadier section of the market at 5d. per lb., an improvement in the tone being reported. Saltcake is in quietly steady demand for both branches of trade, the price to home consumers keeping firm at £4 10s. per ton. The demand for sulphide of sodium continues quiet and values are easy, though not perceptibly lower than last week; 60–65 per cent. concentrated solid is offering at £14 15s. per ton, and crystals at about £9 5s. Chlorate of soda still fails to attract much buying interest, and prices have been shaded to round 2½d. per lb. Hyposulphite of soda is quiet but steady at £15 per ton for photographic crystals and £9 5s. for commercial. Alkali is being taken up in fair quantities, both by home users and for shipment; price is unchanged at £6 15s. per ton for 58 per cent. material. Glauber salts continue inactive, with values still ranging round £3 10s. per ton. Caustic soda is being steadily called for and prices are firmly maintained at from £16 17s. 6d. per ton for 60 per cent. strength to £19 7s. 6d. for 76–77 per cent. Soda crystals keep quiet but steady at £5 5s. per ton. Bleaching powder is unchanged at about £10 per ton, but the demand is still only on a moderate scale. Bichromate of soda is steady and in fairly active inquiry at 4½d. per lb. In the absence of serious business phosphate of soda is weaker again, quotations ranging round £13 10s. per ton. With supplies still short, nitrite of soda keeps very firm at £28 10s. per ton. Acetate of soda is only in quiet demand, but values are fully maintained at £23 10s. to £24 per ton. Bicarbonate of soda is in fair request at £10 10s. per ton.

Caustic and carbonate of potash are less active and prices are still easy though no quotable change from last week can be reported. Caustic potash, 90 per cent. strength, is quoted at £29 to £30 per ton, and carbonate, 90 per cent., at £24 to £25. Yellow prussiate of potash is rather steadier at 8¼d. to 8½d. per lb. Chlorate of potash still attracts little attention and values are easier at 2¾d. per lb. Permanganate of potash is fairly steady at 7¾d. to 8¼d. per lb., but the demand is not pressing. Bichromate of potash meets with a moderate amount of inquiry at 5¼d. per lb.

Arsenic is about unaltered from last week at round £64 per ton, Manchester, for white powdered, Cornish makes; actual demand at the moment is not very strong, though a fair volume of inquiry for forward delivery for export has been reported. Sulphate of copper is a little stronger; to-day's value is round £24 10s. per ton f.o.b. Acetate of lead is only in moderate request, but prices are firmly maintained at £50 per ton for white and £48 for brown. Nitrate of lead likewise is well held at about £44 per ton. Acetate of lime is quiet at £20 to £21 for grey and £14 10s. to £15 per ton for brown. Commercial Epsom salts are unchanged at £4 10s. for British; magnesium sulphate, B.P., is still quoted at about £6 10s.

Acids and Tar Products

Tartaric acid is only moderately active and quotations are easy at about 1s. 1¼d. per lb. Citric acid has rather a better tone at 1s. 5¼d. per lb. Oxalic acid is featureless at 5½d. per lb. Acetic acid still meets with a fairly good demand and values are steady; 80 per cent. commercial is on offer at £48 per ton, and glacial at £70.

Current values for pitch are £3 5s. to £3 10s. per ton, Manchester; prompt business is still restricted though inquiry for next season's shipment is already coming through. Creosote oil is quiet at 8¼d. per gallon. Carbolic acid keeps steadier at 2s. 3d. per gallon for crude and 8¾d. per lb. for crystal. Solvent naphtha is again firmer at 1s. 4¼d. per gallon. Naphthalenes are quiet at £17 for refined and £7 and upwards per ton for crude.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, 51 and 52, Chancery Lane, W.C.2, from whom further information may be obtained. (Opposition to the Registration of the following Trade Marks can be lodged up to April 26, 1924.)

JELLENE.

441,229. For chemical substances prepared for use in medicine and pharmacy. Herbert Charles Miller, trading as the Melanoca Co., Mill Green Road, Beddington Corner, Mitcham, Surrey, manufacturing chemist. October 1, 1923.

"KINAC."

443,793. For preservative coating for films, in the nature of varnish. Class 1. R. M. Film Coating Co., Ltd., 64, Station Road, Barnes, London, S.W.13; film coaters. December 19, 1923.

"GRAPNEL."

445,253. For liquid glue. Class 1. The Improved Liquid Glues Co., Ltd., Imperial House, 15, 17 and 19, Kingsway, London, W.C.2; manufacturers. February 8, 1924.

"MERCUTIN."

444,878. For chemical substances prepared for use in medicine and pharmacy. Class 3. Chemische Fabrik auf Actien (vorm E. Schering) (a joint stock company organised under the laws of Germany), Mullerstrasse 170/171, Berlin, N. 39, Germany; manufacturers. January 29, 1924.

"LIPOVAR."

444,929. For chemical substances prepared for use in medicine and pharmacy. Class 3. Society of Chemical Industry in Basle (a share company organised under the laws of the Swiss Republic), 141 to 227, Klybeckstrasse, Basle, Switzerland; manufacturers and merchants. January 30, 1924.

"FUROGEN."

444,329. For aniline dyes (not mineral). Class 4. Lionel Blundell, "Hillside," Prestwich Park, Manchester; aniline dye manufacturer. January 11, 1924.

"BRENTHOL."

445,477. For dyes, colouring matters and raw or partly prepared products used in the production of colours, not included in other classes. Class 4. British Synthetics, Ltd., Imperial House, Kingsway, London, W.C.2; manufacturing chemists. February 16, 1924.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CENTRIFUGAL PUMPS FOR NEW ZEALAND.—H.M. Trade Commissioner at Wellington reports that tenders are invited by the Wairoa Borough Council for the supply and delivery of centrifugal pumps and electric motors. (Reference No. D.O.T. 13377/E.D./E.C./2).

SULPHATE OF ALUMINA.—A commission agent in Gothenburg desires to secure the representation for Sweden of British exporters of sulphate of alumina for use in the paper trade.

TENDERS INVITED FOR STEEL OIL DRUMS.—The Corporation of Trinity House invite tenders for the supply and delivery to Trinity Wharf, Neyland, South Wales, of 100 five-gallon steel oil drums. Forms of tender and specifications with all necessary information may be obtained on application to Trinity House, Tower Hill, London, E.C.3, between the hours of 10.30 a.m. and 4.30 p.m.

STONE-CRUSHING MACHINERY AND CENTRIFUGAL FANS.—A firm of mechanical and electrical engineers in Melbourne, Australia, desires to secure the representation of British manufacturers of stone-crushing machinery, centrifugal fans, etc.

PUMPING PLANT, BOILERS, ETC.—A recently organised engineering concern in Winnipeg desire to secure the representation on a commission basis, for Western Canada, of British manufacturers of pumping equipment, boilers, coke and gas producing equipment and similar plant.

Company News

SIAMESE TIN SYNDICATE.—An interim dividend of 10 per cent., less tax, in respect of the year 1924, is announced, payable on April 15.

AMERICAN CYANAMID CO.—A dividend of $1½ per share has been declared on the preferred stock, and $1 per share, plus $½ extra, on the common stock, both payable on April 1.

BRITISH PORTLAND CEMENT MANUFACTURERS.—The directors recommend a final dividend of 5 per cent. on the ordinary shares, making 10 per cent. for the year, the same as for the previous year, leaving £187,751 to be carried forward.

SWEDISH MATCH CO.—The net profits for the year to December 31 last amounted to 16,338,323 crowns. The directors propose a dividend of 12 per cent. for the year, absorbing 10,800,000 crowns, leaving 9,731,905 crowns to be carried forward.

MASON AND BARRY, LTD.—The directors have decided to recommend at the general meeting to be held on April 14 a dividend out of profits for the year 1923 of 3s. 6d. per share, or 17½ per cent., less tax, carrying forward £36,209, subject to corporation profits tax.

THARSIS SULPHUR AND COPPER CO., LTD.—The directors recommend a dividend of 10 per cent. (equal to 4s. per share), less tax, from the profits of the year 1923. After writing off £27,486, £30,225 is carried forward. For 1922 the dividend was 12½ per cent., less tax, and £29,145 was carried forward.

ENGLISH MARGARINE WORKS (1919), LTD.—The report for the year 1923 shows a net profit of £38,810, plus £399 brought in and £4,183 refund of corporation profits tax. After placing £20,000 to reserve for depreciation, writing £2,302 off motors, and placing £4,948 to reserve for income tax, £15,341 is carried forward.

C. AND W. WALKER, LTD.—The net profits for the year ended January 31 last were £24,301, and £21,698 was brought forward. A final dividend of 5 per cent. and a bonus of 5 per cent. are proposed on the ordinary shares, making 15 per cent., free of income tax, for the year, adding £5,000 to the reserve, and carrying forward £25,504.

UNITED GLASS BOTTLE MANUFACTURERS.—The net profits for the year 1923 were £43,388, after providing for debenture interest, and £54,445 were brought forward, while £28,090 has been transferred from the contingency account, and £44,356 from the reserve for taxes, making a total for appropriation of £170,279. The board have added £40,000 to the reserve, and propose to carry forward the remaining £130,279.

BROKEN HILL SOUTH.—In an interim report for the half year ended December 31 the directors estimate revenue from treatment of crude ore and dump slime, including realisation from production of previous periods, and sundry income, at £547,000. Working and administrative expenses, debenture interest and redemption, depreciation, taxes, and new plant are estimated to take £350,000, leaving a surplus of £197,000. For the preceding twelve months the profit was £323,000.

BELL'S UNITED ASBESTOS CO., LTD.—The directors have resolved to recommend to the shareholders at the annual general meeting to be held on April 10, the payment of a balance dividend of 1s. 6d. per share on the ordinary shares, which, with the interim dividend paid in October last, makes a total distribution of 10 per cent. for the year; that £10,000 be placed to reserve for depreciation and contingencies, increasing that fund to £38,000; and that £31,483 be carried forward.

Affairs of Mr. J. B. Sharp

THE public examination of James Booth Sharp, of 66, Wellington Road, Southport, Lancashire, director of J. B. and W. R. Sharp, Ltd., colour merchants, Lumb Works, Edenfield, was held on Tuesday, March 25, in Liverpool. The statement of affairs showed liabilities of £7,051, and no assets, and failure was attributed to the trade slump, resulting in contracts being cancelled, and the depreciation in value of stocks. The debtor admitted that he had during the last three years borrowed money and owed one firm of moneylenders £1,000, mostly for interest. The examination was closed.

UNITED·ALKALI·CO·LTD
HEAD OFFICE, CUNARD BUILDING
LIVERPOOL
TELEGRAMS "UBIQUE"
TELEPHONE BANK 9280
HEAVY CHEMICALS ARE THE FOUNDATIONS OF INDUSTRY
They are necessary for
SOAP, DYES, PAPER, GLASS, METALS, TANNERS, TEXTILES, OIL REFINERS, AGRICULTURE,
and
INDUSTRIES OF ALL KINDS.
EXHIBIT No. A 52
CHEMICAL SECTION, PALACE OF INDUSTRY,
BRITISH EMPIRE EXHIBITION.
FROM OUR WORKS CLOSE TO THE PRINCIPAL SEA-PORTS We Supply ALL PARTS OF THE WORLD
GLASGOW
NEWCASTLE ON TYNE
GATESHEAD
HEBBURN
MIDDLESBROUGH
FLEETWOOD
ST HELENS
LIVERPOOL
WIDNES
RUNCORN
BRISTOL
LONDON
CANADA
U·S·A
BALTIC & SCANDINAVIA
HOLLAND
BELGIUM
N. EUROPE
HOLLAND
BELGIUM
U·S·A
MEXICO
CENTRAL AMERICA
SOUTH AMERICA
AUSTRALIA
AFRICA
ASIA
SOUTH EUROPE
SOUTH AFRICA
AUSTRALIA
FAR EAST

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

HODSON, Mr. F., Ouse Bridge House, Carlton, artificial manure manufacturer. (C.C., 29/3/24.) £28 13 3d. February 18.

RIDLEY, James, Farnage, Swanscote Lodge, near Macclesfield, chemical manufacturer. (C.C., 29/3/24.) £19 3s. 10d. February 18.

WOODBROOK DRUG CO., Vale Place, Merridale Street, Wolverhampton, chemists. (C.C., 29/3/24.) £20. February 20.

London Gazette

Company Winding Up Voluntarily

STANDAR CHEMICAL ENGINEERING CO., LTD. (C.W.U.V., 29/3/24.) R. G. Sidford, 36, Southampton Street, Strand, W.C., appointed liquidator. Meeting of creditors at liquidator's office, 12 noon on Monday, April 7. Creditors' claims by April 30.

Notice of Intended Dividend

CARRERAS, Alfonso, and CARRERAS, Enrique, trading as A. and E. CARRERAS, 207, King Street, London, W.C., tooth paste manufacturers. Last day for receiving proofs, April 7. Trustee, D. Hart, 5, Argyll Street, London, W.

Notice of Dividend

SWITHENBANK, Harold, 132, Beeches Road, West Bromwich, Staffordshire, analytical chemist. Sixth dividend, 1s. per £, payable March 31. Official Receiver's office, 191, Corporation Street, Birmingham.

Partnership Dissolved

KANADIO CO. (William Charles James CASHFORD, Charles Horace IVINSON and Percy Casswell AYERS), manufacturers and dealers in synthetic turpentine, 39, Victoria Street, Westminster, by mutual consent as from February 29, 1924. Debts received and paid by C. H. Ivinson and P. C. Ayers.

Private Meeting

A meeting of the creditors of A. D. CHESTER AND CO., LTD., chemical manufacturers, Regent Street, London, was held on March 25. The chair was taken by Mr. W. Abbott, liquidator in the voluntary liquidation of the company. The liabilities amounted to £2,388 17s. 10d., while the assets were approximately £500. The creditors decided to confirm the voluntary liquidation of the company with Mr. Abbott as liquidator.

New Companies Registered

DAVIES, AGOOS AND CO., LTD., 4–6, Tyer's Gateway, Bermondsey Street, London, S.E.1. Manufacturers, workers, dressers, importers and exporters of and dealers in leather and leather goods, tanners; manufacturers of and dealers in glue, gelatine, dyes, grease, oil, soap, chemicals. Nominal capital, £5,000 in £1 shares.

HASSALL AND CO., LTD.—Chemical manufacturers, chemists, druggists, dyers, drysalters, oil and colourmen, etc. Nominal capital, £8,000 in £1 shares (7,000 8 per cent. cumulative preference). A director: J. C. Hassall, 56, Bowes Road, London, N.13.

WHEELER AND HUISKING, LTD., 9, Great Tower Street, London, E.C. Importers and exporters of drugs, spices and essential oils. Nominal capital, £12,000 in £1 shares.

WOLLASTON GAS PRODUCERS (MANCHESTER), LTD., 26, Corporation Street, Manchester. Manufacturers, designers and suppliers of and dealers in gas and chemical plant, etc. Nominal capital, £1,000 in £1 shares.

German Commerce and Industry

THE Commercial Secretary at Berlin (Mr. J. W. F. Thelwall) has forwarded to the Department of Overseas Trade a review, based on the monthly reports of the Prussian Chambers of Commerce, of the trade and industry of Germany during February, in which he states that "economic life is slowly recovering from the decline which occurred at the end of the past year. In February, 1924, the basic industries were able to increase their production as a result of the improved output of the workers; unemployment decreased, and prices again fell slightly. Trade increased, particularly so far as textiles were concerned. For the first time a slight improvement in the conditions in Occupied Territory was noticeable, at any rate as regards production.

In the potash industry there was no improvement in sales, in spite of a substantial reduction of prices. While in former years German agriculture covered its main requirements in fertilisers in February, this year practically no orders were received. Not until the end of the month was there a slight improvement owing to the offer of Reichsbank credits which make it possible for farmers to defer payment for fertilisers until after the gathering of the new harvest. Potash exports were very small and were effected at low prices, as, in view of the fall of the franc, the Alsatian industry is at present endeavouring to secure the foreign market. For this reason the German works had also to reduce their prices, so that frequently the costs of production could no longer be covered. The output in individual works showed a considerable increase.

The position of the chemical industry showed no change of any importance. In Occupied Territory much difficulty is being experienced in re-starting the works. Resort had to be made to an extension of working hours and a reduction of the number of employees. The power of competition with foreign countries is limited, as the latter can work with considerably cheaper raw materials. Owing to the more active employment in the textile industry, inland business in dyes became livelier. There was a fairly large demand from Japan. As regards foreign trade, the world's market prices were still lower than the German prices.

Fertilisers and Feeding Stuffs

THE Fertilisers and Feeding Stuffs Act and the professional aspects of agricultural analysis formed the subject of an interesting paper presented to the members of the Leeds Area of the Institute of Chemistry, in Leeds on Wednesday, by Dr. N. M. Comber, Lecturer in Agricultural Chemistry in the University of Leeds. Remarking that the Act was only partially successful, Dr. Comber said the checking by analysis of the guarantees under which fertilisers and feeding stuffs were sold was almost inoperative in some parts of the country. This was largely due to the fact that local authorities and official samplers were under no obligation to take samples except at the request of the purchaser, and on payment by him of a prescribed fee. All forms of quick-lime and carbonate of lime should be included among the fertilisers, and the carbohydrate and maximum fibre content of feeding stuffs should be included in the guarantee.

In addition to the provisions of the Fertilisers and Feeding Stuffs Act, there were facilities offered by some educational authorities for analyses to be carried out for the information of a farmer at nominal fees. This raised an important point of professional etiquette. In general, it seemed obvious that educational authorities should only undertake analyses, the results of which had a definite educational value, and which helped to elucidate hitherto unsolved problems.

Recent Wills

Mr. James Roberton Watson, of 12, Muiryfauld Drive, Parkhead, Glasgow, Professor of Chemistry in the Anderson College of Medicine, Glasgow £21,073

Mr. Lawrence Briant, Forest Green House, Ockley, Surrey, of Briant and Harman, consulting and analytical chemists £54,905

Mr. Edwin Crowther Stead, of Hawkhill House, Guiseley, retired dyeworks manager £5,756

Mr. Ivan Nicholaievitch Ivanoff, of Antrim House, Antrim Road, Hampstead, London, author of articles on chemistry in Russian and other foreign scientific journals £4,170